BULLETIN

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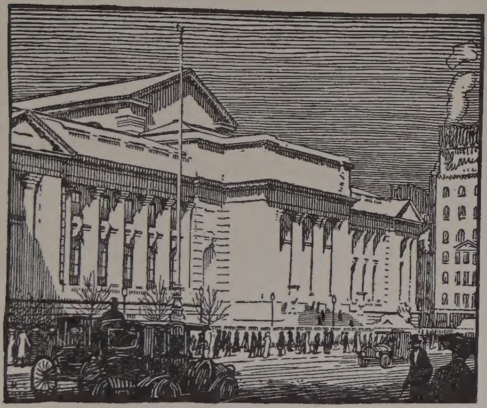

FEBRUARY 1927

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NEW YORK
1927

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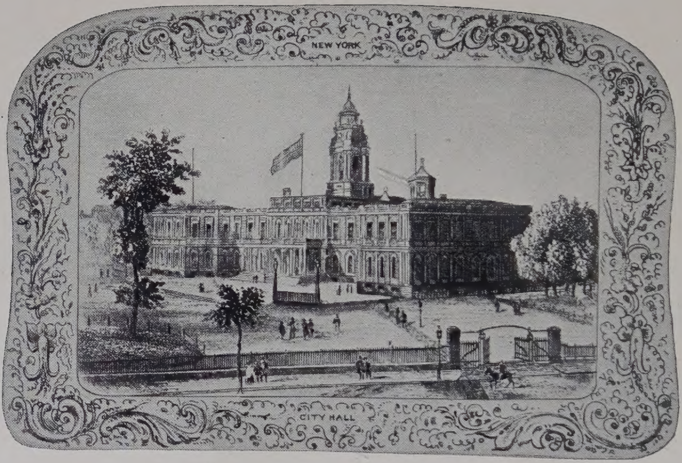

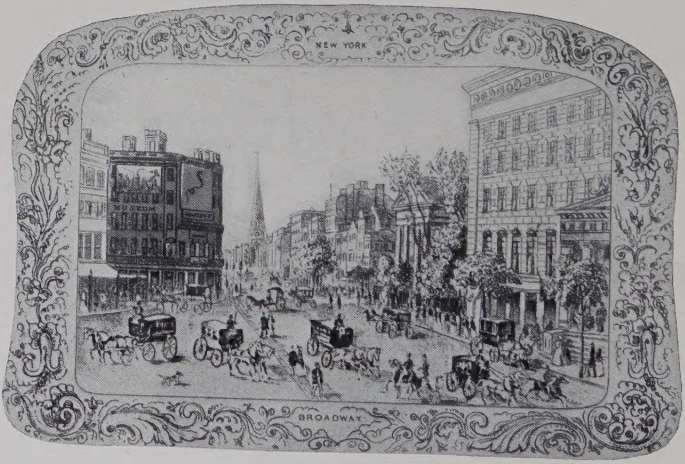

TWO NEW YORK CITY VIEWS BY KÖLLNER

BULLETIN

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NEW YORK PUBLIC LIBRARY

ASTOR, LENOX AND TILDEN FOUNDATIONS

VOLUME 31 FEBRUARY, 1927 NUMBER 2

NEW YORK CITY VIEWS

PRESENTED BY DR. CHARLES BURT LYMAN

IN a recent examination of family papers, Dr. Charles Burt Lyman of Rockford, Illinois, discovered two small, thin copper plates engraved with a view of lower Broadway, looking south from in front of the old Astor House, and a view of the City Hall from the south-east. He felt they would be more useful in New York than in Rockford, and sent them to Mayor Walker; the Mayor's office in turn sent them to the Library for preservation.

Dr. Lyman is not certain how long they have been in his family, but thinks they must have come from his grandfather, Dr. William Lyman, who moved to Rockford about the middle of the last century and practiced his profession as physician there for the rest of his life.

The accompanying reproductions give a good idea of the appearance of the plates, and show clearly that they belong in date to the middle of the century. For the success of this reproduction credit must be given to Mr. Ransom E. Noble, a New York engraver. Through his skill and interest proofs were taken from the copper plates; the proofs were photographed, then reversed by means of a wet plate, a half-tone engraving then made with letter press and engraving reading as normally, from left to right and not from right to left as would have been the case with an engraving made without this special care.

A glance at the originals makes plain that they were not intended to be used for printing. They are small, about three and one-half inches wide and two and one-quarter inches high, but in that respect they do not differ from dozens of other printing plates. They do differ, however, in the thickness of the plate (these being about as thin as the old-fashioned stencils for putting embroidery designs on linen), in the depth of the engraving, and in the relation between the view depicted and the letter-press. The incised lines are very shallow, apparently a combination of etching and engraving. If they had been done for printing, the scene as well as the letter-press would have been reversed, and the lines would have been cut deeper.

Being evidently intended to be seen and read as ordinary letter-press, the field of speculation about intent and purpose is wide. Were they done as tops for snuff boxes? Possibly. Were they done to transfer to Staffordshire ware? As decoration for pocket books? As adornment for the trumpet or helmet of one of the volunteer firemen at that time so active an element in city life? For some other purpose?

No satisfactory solution has yet been found, though they have been submitted to engravers, printers, print collectors, to any who seemed likely to know about them.

A very hasty examination shows that they belong to the middle of the last century, but when one begins to fix a more definite date several things have to be considered. As the Astor House is plainly a finished structure the view of Broadway must come after 1836 when that building was opened for use. Whether the Museum on the corner of Ann Street is Scudder's or Barnum's is a matter of speculation. Scudder opened in 1830 and Barnum took it over in 1842. No name of proprietor appears, and one may be forgiven for wondering if the retiring, shrinking recluse who introduced Tom Thumb to the world just about the time he took over the Museum would let the passer-by fail to see the name of Barnum displayed with proper emphasis. But the spire of Trinity church shows a cross, which sets the date as after 1845, for it was in that year the cross was put on the steeple.

After study of the print had reached this stage the copper plate was shown to Mr. Thomas W. Hotchkiss, who has worked so much with Mr. I. N. Phelps Stokes on "The Iconography of Manhattan." He called attention to the similarity between the copper print and two engravings in his possession, a similarity so striking as to suggest common origin. Both of these prints were published by Hermann J. Meyer, the editor and publisher of such well known works as the "Universum," the "Reisebuecher," and the "Konversations-Lexikon," issued in the middle of the century. One print had been "drawn after nature" (no word as to the artist) and copyrighted by Meyer from 164 William Street. The other was signed by Ahrens as engraver and published probably in Germany. Ahrens seems to have escaped notice in the ordinary works of reference, but as the New York City directories locate Meyer at 164 William Street between 1852/3 and 1856/7 an approximate date of publication was established, and inferentially a date of the drawing.

At this stage Dr. Weitenkampf found in the Print Room a lithograph that had undoubtedly served as the common source for the line engravings published by Meyer and for the copper plate presented by Mr. Lyman. This had been "drawn from nature by Aug. Köllner," lithographing had been done by Deroy, printing by Cattier, and the print had been published by Goupil as number 44 of a series issued about 1850; it bore the copyright notice of Köllner taken out in 1850.

Hard upon this came the discovery of a view of Broadway, engraved as a half-tone on one page of "The Century Magazine" for August, 1902, being part of an article by Joel Benton on "P. T. Barnum, Showman and Humorist." A glance showed that the half-tone reproduced a drawing, not an engraving, even though the legend told that it had been made "from a print lent by E. B. Holden." The signature of Köllner was plain in the lower left hand corner, and it was not long before an entry was brought to light in the catalogue of the E. B. Holden sale at the American Art Galleries in April, 1910, for the original drawing reproduced in the Century article and undoubtedly serving as common source for the Meyer prints and for the copper plate from Rockford. The drawing was bought for the New York Historical Society at the Holden sale, and, with another by Köllner showing Wall Street and sold at the same time, is now in the New York City room of the Society building.

One's first impression, fixing the date as about 1850, is thus confirmed through satisfactory documentary evidence.

With Köllner established as source for the Broadway view it was not surprising to find him also serving as source for the City Hall plate. No. 45 of the series published by Goupil that contained the Broadway view, as 44, is a view of the City Hall undeniably identical with the Lyman copper plate, "drawn from nature by Aug. Köllner," lithographed by Deroy, printed by Cattier, and copyrighted by Köllner in 1850. The two plates both follow these lithographs of 1850, and Köllner should properly be given credit as draughtsman and artist.

The fence around the City Hall appears on views as late as 1859 (Stokes' "Iconography," volume 3, plate 150) and is not shown on views dated 1871. Consultation of various books seemed to bring no light, and here again the field of speculation opened alluringly. One suggestion was made that the fence was probably taken down because of the use of the park during the Civil War, but this was promptly contradicted by the assurance from a gentleman of undisputed accuracy of memory that he recalled that the fence was used in civil war times for display of recruiting posters and proclamations. Proofs of the reproductions were sent to Dr. Lyman, and brought from him the comment that Mr. Charles Cravens of Rockford, now 74 years of age, recalled playing around the City Hall when a boy and the fence was certainly down then. Mr. Gossage, of the Municipal Reference Library, was fortunate enough to find in the "First annual report of the Board of Commissioners of the Department of Public Parks for the year ending May 1, 1871" two statements fixing the date of removal as 1870/1871.

The first appears on page 44, where the changes due to the construction of the Post-Office and the Court-House are taken up, and it is told how "as a further improvement, the dilapidated iron railing around the Park was entirely removed." The second is on page 224, and runs as follows: "The iron railing and brown stone base course which originally enclosed the Park have been removed."

This is all very well, perhaps, as to when the plates were made, but the question Why? still remains unsolved.

EXPERIMENTERS IN ETCHING

WHAT Beraldi has called the chemistry, the "cookery" of etching, has ever had a special attraction for certain artists. The element of possible uncertainty in the action of the acid, the alluring hunt for new ways of doing things, for new things to do, the juggling with processes and possibilities, these are things which may prove intensely absorbing. Such experimenting may be a transient flirtation, a momentary playing, or it may be an habitual attitude, and result in the bending of the medium to the intent, an individual and discriminating use of processes.

If such excursions into process-land are to be more than amusing or interesting or illuminating exercises in the grammar which we call technique, J. F. Millet's query becomes tinglingly pertinent: "But what have you got to say?" That is, of course, the final test, and it indicates what should be drawn from the exhibition now on view in the Library's Print Gallery, under the title printed at the head of the present notes.

In the end, it is the purpose for which technique is used, that counts. But meanwhile one may accompany not only those of very great reputation, but even those of more modest attainments, into the kitchen of the art. Even the lover of the "stunt" may amuse as one follows him off the straight and narrow path of pure etching, on to the treacherous sliding-pond of combined media. In the course of the pursuit of process, soft-ground, aquatint, mezzotint, burin-work, roulette, sand-paper, Scotch stone, sulphur, files, foul biting and other devices — usually tint producing methods — have been made to add their element of effectiveness to the clean etched line. They are all illustrated here. Chance, gamble, uncertain and alluring speculation have formed, to the artists, an alluring side of what is, in even its slighter manifestations, a pretty little game. And there are, furthermore, variations in tones and textures of papers, in color of ink, in manner of wiping the inked plate for printing. Mixtures of technical methods are quite naturally seized on by the makers of color prints, but that field is barely touched on in the present exhibition; it needs an exhibition by itself.

Some artists go ahead in a clear-sighted way, combining various tricks of the trade, and sometimes, perhaps, quite outside the trade, into an effect of sure prescience and assured result. For example, Jacquemart, in his reproductions of famous bindings. With some you fairly feel the delight in puzzling out new effects by new means. Such were Buhot, Guérard and Bracquemond. Again, there is the somewhat lazy turning to the easy way, as when Jacque does a sky with the ruling machine, a handy tool for our bank-note engravers. Occasionally a technical expedient proves too mechanical in its effect and is abandoned. So L. M. Yale tried a bunch of needles set in a handle. Rembrandt tried double needles, too, for that matter. All sorts of tints have been produced, even textiles have served to put a grain on the plate, — by Daubigny and our own tireless experimenter, C. F. W. Mielatz.

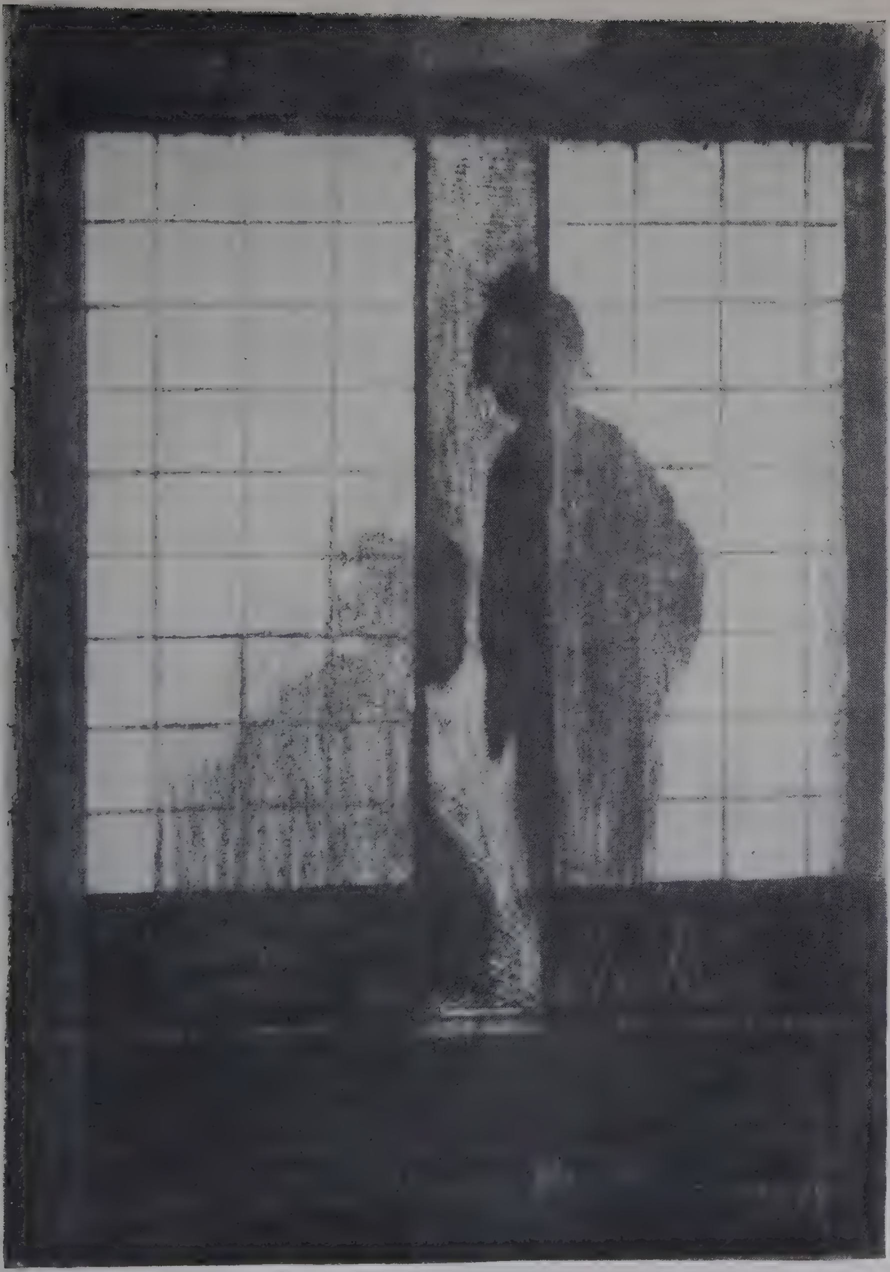
Even in straight etching one may depart from the usual method and draw on the plate in the acid bath, drawing first the lines to be bitten deepest, then the next strong, and so on. The "continuous method," Haden called it. It demands colossal sureness. Again, in printing, the plate may be wiped clean, or a film of ink left on the surface, or "retroussage" may be practiced, or the ink may be teased and worried about the copper with rags of various textures. Lepic is said to have once juggled with ink and rag so as to produce an incredible number of different effects in successive impressions pulled from the same plate. A pretty trick that was, but hardly more. The traditional, legitimate use of etching, drypoint, soft ground, aquatint, or mezzotint may be varied by combining various of these media. Turner tried it, and Buhot, Guérard and others. So these technical possibilities go on as the exhibition is reviewed. Occasionally frank ignorance of the tortuous course of an artist down the dark alleys of process imposes a discreet silence on the label-maker. That adds to the public's zest in the sport of unraveling mysteries, and to the curator's hope of enlightenment from the outside.

The material for the present exhibition seemed to fall most naturally into division by process, rather than by artists. Yet this technical interest represents only one side of the matter. It is simply one of the points of attraction that may lead to enjoyment and appreciation of prints. It does not exist for itself but as a means to an end. That fact is sometimes quite overlooked. There is implied, let us say, the difference between a fatuous fussing with supposedly novel effects, and Whistler's construction of certain "Nocturnes" in which a few lines serve as a slender basis to support a rich tone of ink wiped and ragged into gradations.

So this exhibition may be approached in more than one way. One person may see it all with undivided delight in beholding the wheels go 'round. Another with the single query in mind: "Which of these experiments was worth while, measured by the result?" Still another may combine both points of view. It is a fascinating game, and there is more than one way of playing it. The important point, in the end, is: Had the artist something to say, was it worth saying, did he say it well? In the prints here shown there is disclosed enough variety in individuality to help one pursue these three queries with interest and profit, — even in cases where a negative reply is revealed. The pursuit may be enjoyed until November.

Such exhibitions, whatever the ostensible purpose of their arrangement, should inevitably present good art to the beholder. All that does not fit into that category will not be considered for a steady diet. To adhere to Beraldi's figure of speech, there are no doubt prints here which put one in the position of one trying an odd dish just once, for the fun of the thing. But there are other offerings here to which one will return as to an old favorite of the table, without much attention to all the ingredients of the sauce.

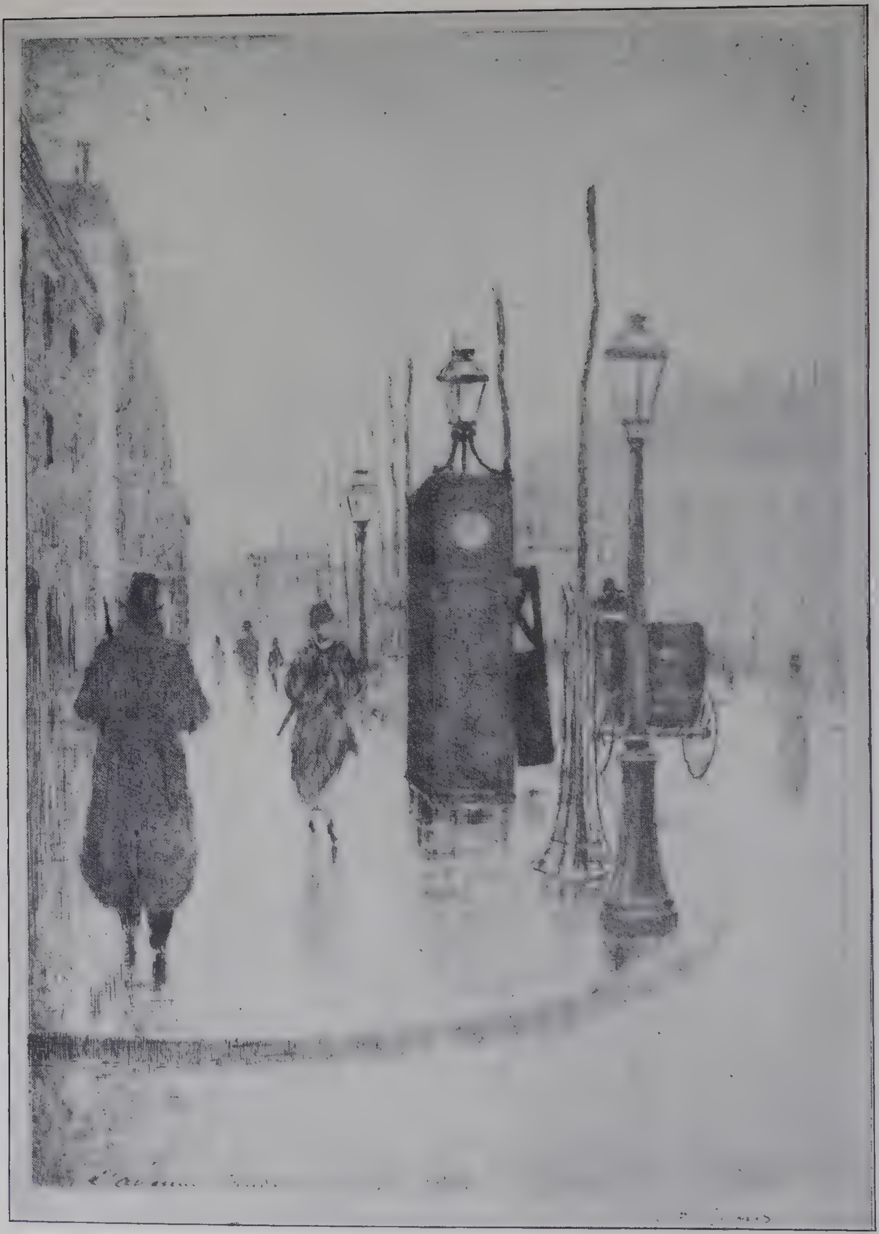
F. W.



EMIL ORLIK

A Japanese Scene

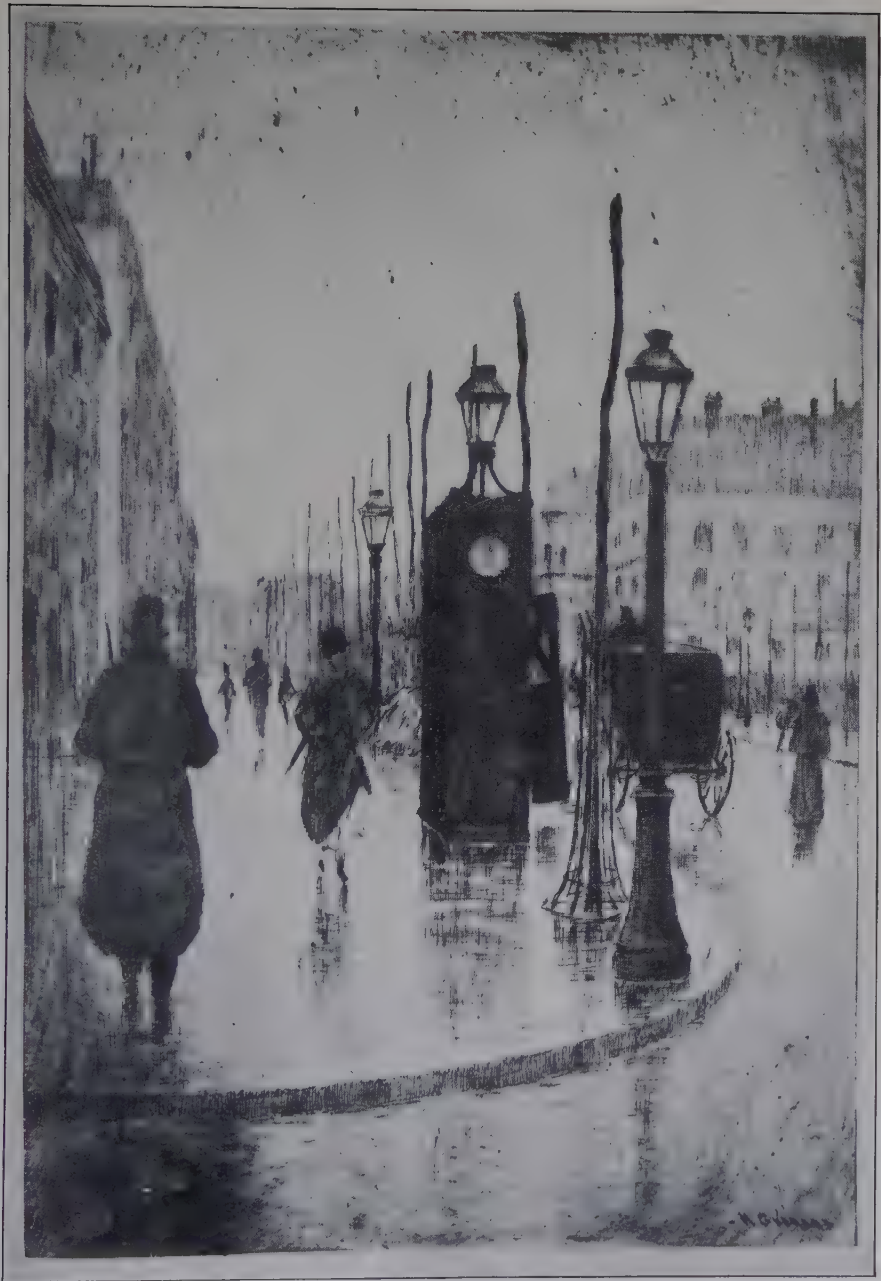
The artist has added a grain tone and rouletting to the etched line



HENRI GUÉRARD

"L'Avenue Trudaine, Paris"

Two impressions from the same plate, showing entirely different effects gained through inking



HENRI GUÉRARD

"L'Avenue Trudaine, Paris"

Two impressions from the same plate, showing entirely different effects gained through inking

NEWS OF THE MONTH

GIFTS

DURING the month of January, 1927, there were received as gifts 4,232 volumes, 9,068 pamphlets, 44 maps, and 27 prints. Some interesting and important items were the following:

The Rockwell Shorthand Collection, comprising 1,167 volumes, 1,334 pamphlets and 1,169 periodicals was purchased from the heirs of Julius Ensign Rockwell by the National Shorthand Reporters Association and presented by it to the Library in continuation of very valuable gifts made previously by the Association.

From Mr. I. N. Phelps Stokes came a copy (on Japanese vellum) of the fifth volume of his work "The Iconography of Manhattan Island 1498-1909, compiled from original sources and illustrated by photo-intaglio reproductions of important maps, plans, views and documents in public and private collections," New York, 1926.

Mr. Hans Volkert gave the Library a collection of his etchings and engravings, together with one mezzotint, one lithograph and two pamphlets ("12 kleine Bildchen gestochen und gedrückt von Hans Volkert, 1925," and "Wellen der Liebe, 12 Lieder mit 4 Radierungen von Hans Volkert," München, n. d.).

From Mr. H. C. Levis, London, England, came two circular prints by T. de Bry ("Prudence" and "Folly") of about the end of the 16th century.

Mr. Grenville Kane gave the Library a copy of "Sermon de Nuestra Señora de El Rosario, Predicado en la Iglesia de Santo Domingo de Guatemala dia 6. de Octubre de 1811 por El Illmo . . . Dr. D. Fr. Ramon Casaus y Torres, Obispo de Rosen, Nueva Guatemala, 1811."

From Mr. Alfred F. Goldsmith came 9 photographs of theatrical celebrities, a lithograph of J. B. Booth, and 27 old theatre programs — all from the Alfred Becks collection.

From Mr. Duane Mowry, Milwaukee, Wis., in continuation of his previous gifts of manuscript material from the private papers of the late Senator James R. Doolittle, came 17 letters.

From the Sun, New York, came 225 bound volumes of the New York American, Journal, World, Times, and Globe.

From Mr. George S. Godard, State Librarian, Connecticut State Library, Hartford, Conn., came a bronze medal struck for the Sesqui-Centennial, Philadelphia, 1926, by the State of Connecticut to "commemorate Nathan Hale, Patriot-Martyr, Connecticut 1755-1776."

From the Preussische Staatsbibliothek, Generaldirektor Dr. H. A. Kruess, Berlin, came a copy of "Albrecht Glockendons Pracht-kalender vom Jahre

1526, Nach dem Original im Besitz der Preussischen Staatsbibliothek im Faksimile und mit Einleitung herausgegeben von Hermann Degering," Leipzig, 1926.

Mr. Kendall Banning gave the Library a facsimile reproduction of the William Tryon broadside, dated 1775 (one of 100 copies made for Christmas distribution from the original document owned by The New York Historical Society). Mr. M. J. Delehanty gave two copies of his "Judicial Chart, showing the organization and jurisdiction of the courts of original and appellate jurisdiction of the State of New York," 1927. From Mr. Columbus O'Donnell Iselin came Volumes 1-3, 1919-1921 (Nos. 179, 360 and 391 of 400 and 429 copies printed) of the "Basler Portraits aller Jahrhunderte, herausgegeben von W. R. Staehelin." From Miss E. Schickel came a collection of 363 photographs of cathedrals and other famous buildings, sculpture, etc. From Mrs. Etta Kemp, Brier, Mass., came a broadside, "Illustrations of Miller's Views of the End of the World, 1843," Boston, published by E. Leland.

Dr. D. Bryson Delavan gave a copy of his work, "Early Days of the Presbyterian Hospital in the City of New York," privately published, 1926. From the Sholem Aleichem Foundation came a copy of the "Shalom Alechem Buch," New York, 1926. From Mr. Robert Grant, Boston, came a copy of his privately printed work, "Occasional Verses 1873-1923" (one of 300 copies printed by the Merrymount Press, Boston, 1926). Mr. Abraham Cahan gave a copy of his work, "Leaves from my Life," New York, 1926 (in Yiddish), in three volumes, the first volume autographed. From Mr. James Macfarlane Little, Bloomfield, N. Y., came a copy of his work, "The Geology and Metal Deposits of Chile," New York, [c. 1926]. Mr. Joseph B. Saunders, Salem, Mass., gave a copy of his work, "A Short Story of Three Centuries of Salem, 1626-1926," c. 1926. Capt. Drew Kirksey Taylor, Austin, Texas, gave a copy of his work, "Taylor's Thrilling Tales of Texas . . . Narrating True Incidents of Frontier Life," c. 1926.

The following collections were received: From Mr. Edward D. Coleman, 17 volumes; from Miss Harriet Hersloff, 13 volumes; from Mrs. Ann G. Kuttner, 6 volumes; from Miss Jeanie Stewart, 24 volumes; and from Mrs. M. J. Wiethan, 79 volumes, 8 pamphlets, and 10 periodicals.

ADDITIONS AND USE OF THE LIBRARY IN JANUARY, 1927

DURING the month of January, 1927, there were received at the Library 22,643 volumes and 12,361 pamphlets. (These include the additions to both Reference and Circulation Departments.) The total number of readers recorded in the Central Building was 167,533. Visitors to the building numbered about 380,000.

NEW PERIODICALS

El **Actor.** Buenos Aires, Argentine. Irregular.

Amateur movie makers. New York. Monthly.

Organ of the Amateur Cinema League.

American Committee for Fair Play in China. Bulletin. San Francisco, Cal. Irregular.

American worker. Hackensack, N. J. Semi-monthly.

Arbeter-Cajtung. Warsaw, Poland. Daily.

Arte fascista. Palermo, Sicily. Monthly.

Auction bridge magazine. Leeds, England. Monthly.

Aviação. Rio de Janeiro, Brazil. Monthly.

Belgrade economic review. Belgrade, Jugoslavia. Monthly.

Biological abstracts. Philadelphia, Pa. Monthly.

Published by the University of Pennsylvania.

Bleter. New York. Monthly.

Buddhism in England. London. 10 nos. a year.

Published by the Buddhist Lodge.

Bulletin of international news. London. Semi-monthly.

Published by the Association for International Understanding.

Cahiers du sud. Marseille. Monthly.

Canada. — Dominion Astrophysical Observatory. Publications. Victoria, B. C. Irregular.

Canadian child welfare news. Ottawa, Canada. Quarterly.

Published by the Canadian Council on Child Welfare.

Central. London. Irregular.

Published by the Old Students' Association of the City and Guilds Engineering College of the Imperial College of Science.

Chase. Lexington, Ky. Monthly.

Organ of the National Foxhunters' Association.

China. — National Epidemic Prevention Bureau. Monthly returns (by provinces) of the prevalence of communicable diseases in China. Peking, China. Monthly.

China Institute in America. Bulletin. New York. Irregular.

Collector's notes. New York. Irregular.

Organ of Elder Coin & Curio Corporation.

El **Colono** cooperador. Dominguez, Entre Rios, Argentine. Weekly.

Commerce, finance and industry. New York. Monthly.

Organ of the Bankers Economic Service, Inc.

Continental and Commercial Banks. Trend of business. Chicago, Ill. Irregular.

Le **Cousin** Pons. Paris. Monthly.

Danske Landmandsbank. Monthly review of the economic situation in Denmark. Copenhagen, Denmark. Monthly.

Desportes. Medellin, Colombia. Monthly.

Organ of the Club Campestre.

Deutsche Volkswirt. Berlin. Weekly.

Dominican Republic. — Senado. Boletín. Santo Domingo, R. D. Semi-monthly.

East Texas. Longview, Texas. Monthly.

Official publication of the East Texas Chamber of Commerce.

Ekonomicheski vestnik Azerbaĭdzhana. Baku, A.S.S.R. Monthly.

Published by Azerbaĭdzhan. — Vyeshi Ekonomicheski Sovet.

Enamelist. Cleveland, Ohio. Monthly.

Die **Erde.** Braunschweig, Germany. Monthly.

Fédération des porteurs de valeurs mobilières pour la défense de l'épargne française. Correspondance. Paris. Irregular.

Fresh air times of the A. I. C. P. New York. Irregular.

Published by the New York Association for Improving the Condition of the Poor.

Gazzetta dell' aviazione. Milano, Italy. Weekly.

Girls' Club journal. London. Three times a year.

Organ of the Federation of Working Girls' Clubs.

Goat world. Vincennes, Ind. Monthly.

Organ of the American Milk Goat Record Association.

Gospodarstvo. Buenos Aires, Argentine. Semi-monthly.

Great thoughts. London. Monthly.

Grobkeramik. Betzdorf-Sieg, Germany. Three times a month.

Hungary. — Pénzügyministerium. Report on financial conditions in Hungary... Budapest, Hungary. Monthly.

Idée neuve. Lyon, France. Bi-monthly.

Indiana studies in business. Bloomington, Ind. Irregular.

Published by Indiana University. — School of Commerce and Finance: Bureau of Business Research.

Istituto federale di credito per il risorgimento delle Venezie. Quaderno. Venice. Monthly.

Krayevedeniye. Leningrad, S.S.S.R. Quarterly.
Published by the Rossiskaya Academiya Nauk. — Tzentralnoye Byuro Krayevedeniya.

Lancaster to-day. Lancaster, Pa. Quarterly.
Published by the Lancaster Chamber of Commerce.

Leipzig, Germany. Mitteilungen aus der Verwaltung der Stadt Leipzig. Leipzig. Irregular.

Leipzig. Leipzig. Monthly.
Published "mit Genehmigung des Rates der Stadt Leipzig."

Lex. Brooklyn, N. Y. Monthly.
Organ of the Sigma Tau Law Fraternity.

Linse. Berlin-Lankwitz, Germany. Monthly.

Mode. New York. Monthly.

Moslem chronicle. Calcutta. Weekly.

Musy kelias. Kaunas, Lithuania. Bi-weekly.

De **Muziek.** Amsterdam, Netherlands. Monthly.
Published by the Federatie van Nederlandsche Toonkunstenaarsvereenigingen.

Nabob. Vancouver, B. C. Monthly.

National hotel and travel gazette. Washington, D. C. Weekly.
Published by the Hotel Association of Washington.

Nebraska State Museum. Bulletin. Lincoln, Neb. Irregular.

New Mexico historical review. Santa Fe, N. M. Quarterly.
Published by the Historical Society of New Mexico.

Newland. Montreal. Monthly.
Organ of the Jewish Immigrant Aid Society of Canada.

North Dakota highway bulletin. Bismarck, N. D. Monthly.
Published by the North Dakota State Highway Commission.

Obra del cançoner popular de Catalunya. Barcelona, Spain. Irregular.

Ohio commerce. Columbus, Ohio. Monthly.
Published by the Ohio State University. — Commerce College.

Open road. Mountain View, N. J. Monthly.

Oriens. Paris. Quarterly.

Osteuropa. Berlin. Monthly.
Published by the Deutsche Gesellschaft zum Studien Osteuropas.

Palestine pictorial. New York. Monthly.
Published by the United Palestine Appeal.

Pennsylvania labor herald. Allentown, Pa. Weekly.

People's Institute. Bulletin. New York. Irregular.

Phi Alpha Delta quarterly. Beverly Hills, Cal. Quarterly.

Pologne littéraire. Warsaw, Poland. Monthly.

Posłaniec. Newark, N. J. Weekly.
Published by the Polsko-Katolickiego Kosciola.

Prawda. Brooklyn, N. Y. Weekly.

The **Recruit.** Chicago, Ill. Monthly.
Published by the Recruiting Union of the Industrial Workers of the World.

Revista nacional mercantil de Marin Hnos. Quito, Ecuador. Monthly.

Revue antibolchévique. Paris. Monthly.
Published by the International Entente against the Third International.

Revue nautique. Paris. Monthly.

Rubber age. London. Monthly.

Schola et vita. Milano. Monthly.
Published by the Instituto pro interlingua.

Scottish Gaelic studies. Aberdeen, Scotland. Semi-annual.
Published by Aberdeen University. — Celtic Department.

Scripps-Howard news. New York. Monthly.

Skelly news. Tulsa, Oklahoma. Monthly.
Published by the Skelly Oil Company.

Social science. Winfield, Kansas. Quarterly.
Organ of Pi Gamma Mu.

Spartakus. Spandau, Germany. Monthly.
Organ of the Spartakusbund.

Spokesman. Berkeley, Cal. Bi-monthly.
Published by the University of California. — Extension Division.

Standard index to philatelic literature. London. Bi-monthly.

Temple chronicle of Temple Emanu-el. San Francisco, Cal. Weekly.

Thébaine. Charenton-Le-Pont (Seine), France. Bi-monthly.

Theistic monthly. St. Paul, Minn. Monthly.
Published by the International Theistic Society.

Vacuum Oil news. New York. Monthly.
Organ of the Vacuum Oil Company.

Vie économique des Soviets. Paris. Bi-monthly.

Vierteljahrshefte zur Konjunkturforschung. Berlin. Quarterly.
Published by the Institut für Konjunkturforschung.

Voce dell' emigrato. New York. Monthly.
Organ of the Italian Auxiliary.

Whaley-Eaton pamphlets. Washington, D. C. Bi-weekly.

Woodwind news. New York. Quarterly.

Your library. Washington, D. C. Monthly.
Published by the District of Columbia Public Library.

STARCHES

1811 – 1925

A LIST OF REFERENCES DEALING WITH THE CHEMISTRY AND TECHNOLOGY OF STARCHES, DEXTRINS AND AMYLASES

COMPILED BY
ROBERT P. WALTON, Science and Technology Division

Order of Arrangement

STARCHES AND DEXTRINS
- Chemical Section
  - Acid Hydrolysis
  - Enzymic Hydrolysis
  - Molecular Constitution
  - Components of Starch Granule
  - Crystalline Dextrins formed by Bacterial Degradation of Starch
  - General Chemical Characteristics
    - Reactions with Iodine
    - Reactions with Formaldehyde
    - Reactions with Bases
    - Reactions with Oxidizing Agents
  - Ethers and Esters
  - Hydrolysis by Salts
  - Soluble and Modified Starches
  - Preservation of Starch Solutions
- Physical Section
  - General Physical Characteristics
    - Viscosity and Plasticity
    - Gelatinization
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  - Microscopic Observations
- Analytical Section
  - Methods of Determination
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- Analytical Section, *continued.*
    - Gravimetric Methods
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- Technological Section
  - Industrial Sources
  - Manufacture of Starch
  - Manufacture and Preparation of Dextrin
  - Starch Factory Waste Waters
  - Industrial Applications of Starch and Dextrin

AMYLASES
- Purification
- General Characteristics
- Activation and Inactivation by Salts, Acids, etc.
- Optimum and Inactivating Temperatures
- Action of Sunlight, Ultra-Violet Rays and Roentgen Rays
- Adsorption of Amylases
- Determination of Activity
  - Determination of Amyloclastic Activity
  - Determination of Saccharogenic Activity
- Mould, Fungus, Yeast and Bacterial Amylases
- Sources and Occurrence
- Industrial Applications

PART II

STARCHES AND DEXTRINS, *continued*

ENZYMIC HYDROLYSIS, *continued*

179. Herzfeld, A. Über die Einwirkung der Diastase auf Stärkekleister. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1879, Jahrg. 12, p. 2120–2123.) **PKA**

Describes preparation of maltose. Maltodextrin is distinguished from erythro- and achroodextrins by the differing solubilities of their acetyl compounds.

Abstract in *Jour. chem. soc.,* 1881, v. 40, p. 1024; *Jahresber. chem.,* 1879, p. 837; *Wag. Jahr.,* 1879, Jahrg. 25, p. 684–686; *Bull. soc. chim. Paris,* 1880, tome 34, p. 538; *Central-Blatt für Agrikulturchemie, Biedermann's,* Leipzig, 1881, Jahrg. 10, p. 203–204.

180. Musculus, Fritz, and Von Mering. De l'action de la diastase, de la salive et du suc pancréatique sur l'amidon et sur le glycogène. (Académie des sciences, Comptes rendus, Paris, 1879, tome 88, p. 87–88.) ***EO**

Contradicting the work of Nasse (*entry 173*) finds that the principal products of the action of saliva on starch are maltose, together with certain reducing but non-fermentable dextrins and a very small quantity of dextrose. The action of pancreatic juice on starch is the same as that of saliva.

Reprinted in further detail in *Bull. soc. chim. Paris,* 1879, tome 31, semestre 1, p. 105–116; *Zeitschrift für physiologische Chemie,* 1878–79, Bd. 2, p. 403–419.

Abstract in *Jour. chem. soc.,* 1879, v. 36, p. 370; *Ber.,* 1879, Jahrg. 12, p. 700.

Starches and Dextrins, continued.

Enzymic Hydrolysis, continued.

181. O'Sullivan, Cornelius. On the transformation-products of starch. (Chemical Society of London, Journal, 1879, v. 35, p. 770–785.) **PKA**

Reasserts that the molecule of starch, under the influence of malt extract splits up according to one of 4 equations. Gives details of the preparation of soluble starch and the various dextrins. Investigates the action of malt extract on these products.

First portion reprinted in *Bull. soc. chim. Paris,* 1879, nouv. série, tome 32, semestre 2, p. 493–499.
Abstract in *Chem. news,* 1879, v. 40, p. 236; *Jahresber. Chem.,* 1879, p. 845.

182. Seegen, J. Berichtigende Bemerkung zu der Von Musculus und Von Mering mitgetheilten Arbeit "Über die Umwandlung von Stärke" etc. (Zeitschrift für physiologische Chemie, Hoppe-Seyler's, Strassburg, 1879, Bd. 3, p. 212–214.) **PKA**

183. Brown, Horace T., and John Heron. Ueber die hydrolytischen Wirkungen des Pankreas und des Dünndarms. (Annalen der Chemie, Liebig's, Leipzig und Heidelberg, 1880, Bd. 204, p. 228–251.) **PKA**

Confirm the observation of Musculus and Von Mering that maltose is formed in the hydrolysis of starch by the pancreatic gland; at the same time the formation of an achroodextrin was noted. Maltose was obtained in crystalline form and its rotatory and reducing powers verified. They also note the presence of a ferment which hydrolyses maltose to dextrose.

Condensed in *Chemical news,* 1880, v. 42, p. 63–67.
Abstract in *Jour. chem. soc.,* 1880, v. 38, p. 903–904; *ibid.,* 1881, v. 40, p. 114; *Jahresber. Chem.,* 1880, p. 1120–1121.

184. Dubrunfaut, Augustin Pierre. Sur la théorie de la saccharification des matières amylacées. (Moniteur scientifique du docteur Quesneville, Paris, 1880, série 3, tome 10, p. 60–67.)

Available in Library of Columbia University.

185. Herzfeld, A. Ueber Maltodextrin. (Central-Blatt für Agrikulturchemie, Biedermann's, Leipzig, 1880, Jahrg. 9, p. 347–350.)

Available in Library of Department of Agriculture.

186. Musculus, Fritz, and Von Mering. Ueber die Umwandlung der Stärke und des Glykogens durch diastatische Ferment. (Zeitschrift für physiologische Chemie, Hoppe-Seyler's, Strassburg, 1880, Bd. 4, p. 93–99.) **PKA**

Abstract in *Chem. Centr.,* 1880, p. 408.

187. Svoboda, Al. Über das Stärkemehl. (Auszug.) (Chemisches Central-Blatt, Leipzig, 1880, p. 169.) **PKA**

A study of the changes produced in the layers of the starch granule by the action of amylase.

188. Chittenden, R. H., and W. L. Griswold. On the diastatic action of saliva. (American chemical journal, Baltimore, 1881–82, v. 3, p. 305–316.) **PKA**

189. Mering, von. Ueber den Einfluss diastatischer Fermente auf Stärke, Dextrin und Maltose. (Zeitschrift für physiologische Chemie, Hoppe-Seyler's, Strassburg, 1881, Bd. 5, p. 185–197.) **PKA**

The prolonged action of diastase and saliva on starch results in the formation of glucose, apparently due to action of the ferment on maltose. Two dextrins are formed which differ in their resistance to ferments.

Abstract in *Jour. chem. soc.,* 1882, v. 42, p. 749; *Chem. Centr.,* 1881, p. 373; *Wag. Jahr.,* 1881, Jahrg. 27, p. 734; *Jahresber. Chem.,* 1881, p. 1144.

190. Steenbuch, Chr. Zur mikroskopischen Untersuchung des Mehles. Eine Methode, wodurch die Gewebselemente leicht isolirt werden können. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1881, Jahrg. 14, p. 2449–2451.) **PKA**

Describes removal of starch granules by the action of diastase.

Abstract in *Jour. chem. soc.,* 1882, v. 42, p. 559; *Jahresber. Chem.,* 1881, p. 1311–1312.

191. Cuisinier, Léon. La fabrication industrielle du sucre de bière ou maltose. (Sucrerie indigène et coloniale, Paris, 1882, tome 20, p. 362–366.)

Available in Library of Patent Office.

Details the dissolving and saccharification of starch by malt. The resulting maltose is described.

Abstract in *Jour. soc. chem. ind.,* 1882, v. 1, p. 463; 1884, v. 3, p. 492; *Chem. Centr.,* 1884, p. 413–414; *Jahresber. Chem.,* 1884, p. 1803.

192. Bauml, A. Ueber Maismalz. (Auszug.) (Dingler's polytechnisches Journal, Stuttgart, 1884, Bd. 252, p. 303.) **3–VA**

Mashing with maize malt gives a lower conversion of starch than with barley malt.

Abstract in *Jour. soc. chem. ind.,* 1884, v. 3, p. 528.

193. Hartley, W. N. Leçons sur la fermentation faites à la Société des arts de Londres. (Moniteur scientifique du docteur Quesneville, Paris, 1884, série 3, tome 14, p. 1253–1263.)

Available in Library of Columbia University.

Describes properties of starch and dextrin and gives probable mechanism of their hy-

Starches and Dextrins, continued.
Enzymic Hydrolysis, continued.

drolysis. Gelatinization temperatures for various starches are included.

194. Squire, W. S. On the processes concerned in the conversion of starch into alcohol, and their relation to brewing and distilling. (Society of Chemical Industry, Journal, London, 1884, v. 3, p. 397–407.) **VOA**

Discussion, p. 543–549.

Abstract in *Jahresber. Chem.*, 1884, p. 1802.

195. Brasse, L. Action de la diastase du malt sur l'amidon cru. (Académie des sciences, Comptes rendus, Paris, 1885, tome 100, p. 454–456.) ***EO**

The diastase extracted from barley or from leaves by Dubrunfaut's method exerts a digestive action on natural starch which has not been subjected to any previous treatment. The most favorable temperature is 42°; glucose is the sole product of the conversion.

Abstract in *Jour. chem. soc.*, 1885, v. 48, p. 499; *Chem. Centr.*, 1885, p. 201; *Jahresber. Chem.*, 1885, p. 1758.

196. Brown, Horace T., and G. Harris Morris. On the non-crystallisable products of the action of diastase upon starch. (Chemical Society of London, Journal, 1885, v. 47, p. 527–570.) **PKA**

Show that at any stage of the conversion of starch by amylase the total product, in its optical properties and relation to Fehling's solution, behaves as if it were made up only of maltose and dextrin. A substance termed "malto-dextrin" is prepared by the limited action of malt extract upon starch. The dextrin is converted completely into maltose by amylase, is not changed by precipitation from alcohol, and dialyses as a whole.

Reprinted in *Annalen der Chemie, Liebig's*, 1885, Bd. 231, p. 72–136, *PKA*.

Condensed in *Wag. Jahr.*, 1885, Jahrg. 31, p. 660–669.

Abstract in *Chem. news*, 1885, v. 51, p. 308; *Jour. soc. chem. ind.*, 1885, v. 4, p. 682; *Chem. Centr.*, 1886, p. 150–151; *Bull. soc. chim. Paris*, 1888, nouv. série, tome 50, semestre 2, p. 390.

197. Cuisinier, Léon. La glucase et la saccharification glucosique des matières amylacées. (Sucrerie indigène et coloniale, Paris, 1886, tome 27, p. 226–227.)

Available in Library of Patent Office.

Finds an enzyme in ungerminated grain which converts starch slowly into dextrose.

Abstract in *Chem. Centr.*, 1886, p. 614; *Jour. chem. soc.*, 1887, v. 54, p. 614.

198. Lintner, Carl J. Zur Kenntnis der Diastasewirkung. (Zeitschrift für das gesammte Brauwesen, München und Leipzig, 1886, Jahrg. 9, p. 330–333.)

Available in Library of the Chemists' Club.

Abstract in *Wag. Jahr.*, 1886, Jahrg. 32, p. 751–753.

199. Benger, F. Baden. On the digestive ferments. (Society of Chemical Industry, Journal, London, 1887, v. 6, p. 189–193.) **VOA**

Includes discussion on conversion of starch by saliva and pancreatic enzymes.

Abstract in *Chem. Zentr.*, 1887, p. 668.

200. Bourquelot, Em. Sur quelques points relatifs à l'action de la salive sur le grain d'amidon. (Académie des sciences, Comptes rendus, Paris, 1887, tome 104, p. 71–74.) ***EO**

The transformation of starch proceeds through two steps; the starch is first hydrated by water and the hydrated starch is then saccharified by saliva. Low concentrations of acids, alkalis, salts or saliva ash are without action.

Abstract in *Jour. chem. soc.*, 1887, v. 52, p. 354; *Wag. Jahr.*, 1887, Jahrg. 33, p. 862.

201. —— Sur la composition du grain d'amidon. (Académie des sciences, Comptes rendus, Paris, 1887, tome 104, p. 177–180.) ***EO**

Heats potato starch with saliva and water at different temperatures for different periods of time and determines amount of sugars formed. As the reaction bears no relation to the time, concludes that starch granules are composed of a complex mixture of carbohydrates.

Abstract in *Jour. chem. soc.*, 1887, v. 52, p. 355; *Jahresber. Chem.*, 1887, p. 2265.

202. Effront, Jean. Produits de la saccharification de l'amidon. (Moniteur scientifique du docteur Quesneville, Paris, 1887, tome 29, p. 513–541.) **OA**

Finds that saccharification by malt and by HCl proceeds through different stages and that dextrins formed are not identical.

Abstract in *Jour. soc. chem. ind.*, 1887, v. 6, p. 733; *Wag. Jahr.*, 1887, Jahrg. 33, p. 875; *Jahresber. Chem.*, 1887, p. 2265–2266.

203. Lintner, Carl J. Über Stärke und Diastase. (Zeitschrift für das gesammte Brauwesen, München und Leipzig, 1888, Jahrg. 11, p. 309–318.)

Available in Library of Chemists' Club.

Discusses role of starch and diastase in malt manufacture and beer brewing.

Abstract in *Chem. Centr.*, 1888, p. 1319.

204. Windisch, W. Ueber die Jodprobe. (Wochenschrift für Brauerei, Berlin, 1888, Jahrg. 5, p. 62–63.)

Available in Library of Brewers' Academy.

Starches and Dextrins, continued.

Enzymic Hydrolysis, continued.

Uses the iodine reaction. For dark colored worts, alcohol should be added, the precipitate dissolved in water and this solution tested with the I reaction.

Abstract in *Chem. Centr.*, 1888, p. 308.

205. **Brauer,** J. E. Wieviel Grünmalz ist zur Verzuckerung eines Kilogramms Stärkemehl erforderlich? (Zeitschrift für Spiritusindustrie, Berlin, 1889, N. F., Jahrg. 12, p. 131.)

Available in Library of Patent Office.

206. **Heinzelmann,** G. Ueber die Ausführung der Jodprobe. (Zeitschrift für Spiritusindustrie, Berlin, 1889, N. F., Jahrg. 12, p. 99–100.)

Available in Library of Patent Office.

Abstract in *Chem. Centr.*, 1889, Bd. 2, p. 713.

207. **Keller,** Wilhelm. Über die Wichtigkeit der Jodprobe in der Spiritus- und Presshefefabrikation. (Deutsche Chemiker-Zeitung, Berlin, 1889, Jahrg. 4, p. 177–178.)

Available in Library of Patent Office.

Discusses use of iodine test for determining extent of saccharification and for determining amount of starch mixed with yeast.

208. **Kruis,** K. Ausführung der Jodprobe. (Auszug.) (Chemisches Central-Blatt, Hamburg und Leipzig, 1889, Bd. 2, p. 713.) **PKA**

209. **Lindet,** Léon. Observations sur la saccharification par la diastase. (Académie des sciences, Comptes rendus, Paris, 1889, tome 108, p. 453–456.) ***EO**

It is shown that accumulation of maltose hinders and finally arrests the saccharifying action of diastase upon starch. By precipitating the maltose with phenyl-hydrazine the remaining dextrins are converted into maltose.

Reprinted in *Bull. soc. chim. Paris*, 1889, série 3, tome 1, semestre 1, p. 425–429.

Abstract in *Jour. soc. chem. ind.*, 1889, v. 8, p. 470, 811; *Chem. Zentr.*, 1889, Bd. 1, p. 521; *Wag. Jahr.*, 1889, Jahrg. 35, p. 1036.

210. **Société générale de maltose de Bruxelles.** Verfahren zur Darstellung haltbarer Malzwürze und fester Diastase sowie zur Verzuckerung mittels derselben. (Zeitschrift für Spiritusindustrie, Berlin, 1889, N. F., Jahrg. 12, p. 291–292.)

Available in Library of the Patent Office.

Hydrofluoric acid is employed to prevent lactic and butyric acid fermentation.

Abstract in *Chem. Centr.*, 1889, Bd. 2, p. 951.

211. **Brown,** Horace T., and G. Harris Morris. On the analysis of a beer of the last century, with some remarks upon the estimation of amyloins (malto-dextrins) in beer. (Abstract.) (Society of Chemical Industry, Journal, London, 1890, v. 9, p. 533.) **VOA**

Discuss the stages in the transformation of starch by amylase. The residual dextrins are termed amyloins.

Also abstracted in *Chem. Centr.*, 1890, Bd. 1, p. 844.

212. **Effront,** Jean. Action des acides minéraux dans la saccharification par le malt et la fermentation des matières amylacées. (Moniteur scientifique du docteur Quesneville, Paris, 1890, tome 35, p. 449–462.)

Available in Library of Columbia University.

Finds a concentration of hydrofluoric acid which inhibits the growth of lactic and butyric acid ferments and does not inhibit the action of amylase. This concentration effectively increases the saccharogenic action of amylase.

Condensed in *Bull. soc. chim. Paris*, 1890, série 3, tome 4, semestre 2, p. 337–339, 627–632.

Abstract in *Chem. Centr.*, 1891, Bd. 1, p. 33.

213. **Lea,** A. S. Artificial and natural digestions. (Journal of physiology, London, 1890, v. 11, p. 226–263.) **QCA**

Includes study of digestion of starch by saliva. It is shown that the digestion products act as a retarding factor.

Abstract in *Jour. chem. soc.*, 1890, v. 58, p. 536; *Jahresber. Chem.*, 1890, p. 2266.

214. **Lintner,** Carl J. Zur Einwirkung von Diastase auf unverkleisterte Stärke. (Auszug.) (Chemisches Central-Blatt, Hamburg und Leipzig, 1890, Bd. 1, p. 500.) **PKA**

Various cereal starches are tested for comparative resisting power to the solvent action of cold water extract of malt at temperatures from 50° to 65°.

Also abstracted in *Jour. soc. chem. ind.*, 1890, v. 9, p. 402.

215. —— Zur Einwirkung von Diastase auf unverkleisterte Stärke. (Wochenschrift für Brauerei, Berlin, 1890, Jahrg. 7, p. 310.)

Available in Library of Brewers' Academy.

A continuation of entry 214, in which maize, rye and oat starches are investigated.

Abstract in *Chem. Centr.*, 1890, Bd. 1, p. 887.

216. **Moritz,** E. R. The influences determining the type and percentage of maltodextrins (amyloïns) in malt worts. (Institute of Brewing, Transactions, London, 1890–91, v. 4, p. 141–158.)

Discussion, p. 159–170.

Available in Library of the Patent Office.

Describes properties of maltodextrins, which are believed to be mixtures of maltose and dextrin. An excess or a deficiency

Starches and Dextrins, continued.

Enzymic Hydrolysis, continued.

of these substances in beer is equally injurious.

Also in *Wag. Jahr.*, 1891, Jahrg. 37, p. 974–986; *Zeitschrift für das gesammte Brauwesen*, N. F., Jahrg. 14, 1891, p. 199–204, 222–230.
Abstract in *Chem. Centr.*, 1891, Bd. 2, p. 324–325.

217. **Donath,** E. Zur Vorausberechnung der Alkoholausbeute aus stärkehaltigen Rohstoffen. (Chemiker-Zeitung, Cöthen, 1891, Jahrg. 15, p. 597–599.) **†† VOA**

Gives formula and discusses causes for variation of results.

Reprinted in *Wag. Jahr.*, 1891, Jahrg. 37, p. 1050–1054.
Abstract in *Jour. soc. chem. ind.*, 1891, v. 10, p. 843.

218. **Effront,** Jean. Action des fluorures solubles sur la diastase. (Société chimique de Paris, Bulletin, 1891, série 3, tome 5, semestre 1, p. 149–152.) **PKA**

Soluble fluorides are shown to be more satisfactory than the free acids as antiseptic agents, in that they can be used in larger quantities and at higher temperatures without injuring the amylase. The favorable influence exhibited by HF and its salts are not due to direct action on amylase but to destruction of the lactic and butyric ferments.

Abstract in *Chem. Centr.*, 1891, Bd. 1, p. 670.

219. —— Action de l'acide fluorhydrique et des fluorures dans la fermentation des matières amylacées. (Société chimique de Paris, Bulletin, 1891, série 3, tome 5, semestre 1, p. 734–740.) **PKA**

220. **Geduld,** Robert. Ein neues Enzym, die Glykase. (Wochenschrift für Brauerei, Berlin, 1891, Jahrg. 8, p. 545–546, 568–570, 618–620.)

Available in Library of the Brewers' Academy.

The new enzyme converts dextrins and maltose into dextrose but does not liquefy starch paste.

Abstract in *Jour. soc. chem. ind.*, 1892, v. 11, p. 627; *Chem. Centr.*, 1891, Bd. 2, p. 323.

221. **Heron,** J. Zur Untersuchung von Malz und Würze. (Abgekürzt.) (Jahres-Bericht der chemischen Technologie, Leipzig, 1891, Jahrg. 36, p. 1030–1036.) **VOA**

Studies enzymic hydrolysis of starch.

222. **Lintner,** Carl J. Über das Vorkommen von Isomaltose im Biere und in der Würze. (Zeitschrift für das gesammte Brauwesen, München und Leipzig, 1891, Jahrg. 14, p. 281–283.)

Available in Library of the Chemists' Club.

By the action of phenylhydrazine a compound is obtained from beer which is identical with the iso-maltosazone of Fischer.

Abstract in *Jour. soc. chem. ind.*, 1892, v. 11, p. 171; *Wag. Jahr.*, 1891, Jahrg. 37, p. 986.

223. **Meyer,** Arthur. Zu der Abhandlung von G. Krabbe: Untersuchungen über das Diastaseferment unter specieller Berücksichtigung seiner Wirkung auf Stärkekörner innerhalb der Pflanze. (Deutsche botanische Gesellschaft, Berichte, Berlin, 1891, Jahrg. 9, p. 238–243.)

Available in Library of Columbia University.

Discusses recent article of Krabbe.

Abstract in *Chem. Centr.*, 1891, Bd. 2, p. 707.

224. **Morris,** G. Harris, and J. G. Wells. Fractional fermentation; a contribution to the study of the amyloïns (Maltodextrins.) (Institute of Brewing, Transactions, London, 1891–92, v. 5, p. 133–172.)

Available in Library of the Patent Office.

Also in *Zeitschrift für das gesammte Brauwesen*, München und Leipzig, 1891, Jahrg. 15, p. 384–386, 395–396, 403–404, 419–422, 437–440.
Condensed in *Wag. Jahr.*, 1892, Jahrg. 38, p. 887–895.
Abstract in *Jour. soc. chem. ind.*, 1892, v. 11, p. 764.

225. **Effront,** Jean. Sur l'emploi de l'acide fluorhydrique et des fluorures en distillerie. (Société d'encouragement pour l'industrie nationale, Bulletin, Paris, 1891, année 90, p. 642–645.) **VA**

Discusses the use of HF at concentrations which paralyse the lactic and butyric ferments but do not materially inhibit the action of diastase. Utilization of the method by several distilleries has resulted in an increase in the production of alcohol.

Abstract in *Jour. soc. chem. ind.*, 1892, v. 11, p. 626.

226. **Amthor,** Carl. Studien über Würze und Bier. (Zeitschrift für das gesammte Brauwesen, München und Leipzig, 1892, Jahrg. 15, p. 57–59, 69–70.)

Available in Library of the Chemists' Club.

Evidence of some constituent of beer which must be malto-dextrin or iso-maltose.

Abstract in *Zeit. ang. Chem.*, 1892, p. 318–320; *Jour. soc. chem. ind.*, 1892, v. 11, p. 767.

227. **Effront,** Jean. Des conditions que doivent présenter les solutions fermentescibles pour que les fluorures y produisent un maximum d'effet. (Moniteur scientifique du docteur Quesneville, Paris, 1892, tome 39, p. 81–85.) **OA**

Finds an acid medium necessary for the antiseptic action of fluorides on the lactic, butyric, and acetic ferments.

Abstract in *Jour. soc. chem. ind.*, 1892, v. 11, p. 931.

Starches and Dextrins, continued.

Enzymic Hydrolysis, continued.

228. **Grierson,** G. A. Notes on starch digestion. (Pharmaceutical journal and transactions, London, 1892–93, v. 52, p. 187–189.) **WTA**

Treats starch pastes with pancreatic extract at 37° and notes time for disappearance of blue iodine reaction. Nine different starch varieties are investigated. Small amounts of alcohol do not appear to affect the digestion.

229. **Lintner,** Carl J. Über Isomaltose und deren Bedeutung für die Bierbrauerei. (Zeitschrift für das gesammte Brauwesen, München und Leipzig, 1892, Jahrg. 15, p. 6–8.)

Available in Library of the Chemists' Club.

Iso-maltose is prepared by the action of diastase on malt. A brief description of its properties is given. The author believes that diastase in acting upon starch forms only maltose, iso-maltose and a dextrin, the amyloïns of Brown and Morris (*entry 211*) probably being a mixture of the last two.

Abstract in *Jour. soc. chem. ind.*, 1892, v. 11, p. 627; *Chem. Centr.*, 1892, Bd. 1, p. 285; *Wag. Jahr.*, 1892, Jahrg. 38, p. 872–874.

230. —— Über die Entstehung von Dextrose aus der Stärke durch fermentative Prozesse. (Zeitschrift für das gesammte Brauwesen, München und Leipzig, 1892, Jahrg. 15, p. 123–124.)

Available in Library of the Chemists' Club.

Finds a small amount of glucase in barley, confirming Cuisinier's observation (*entry 197*). Much larger quantities are found in maize.

Abstract in *Jour. soc. chem. ind.*, 1892, v. 11, p. 1021; *Chem. Centr.*, 1892, Bd. 1, p. 740; *Wag. Jahr.*, 1892, Jahrg. 38, p. 878.

231. **Lintner,** Carl J., and Georg Düll. Versuche zur Gewinnung der Isomaltose aus den Producten der Stärkeumwandlung durch Diastase. (Zeitschrift für angewandte Chemie, Berlin, 1892, p. 263–268.) **PKA**

Maltose was removed by fermentation from a starch conversion mixture, the solution concentrated, and by repeated dialysis and precipitation with alcohol, two fractions of constant rotatory power were obtained, the one consisting of isomaltose and the other of dextrin. The isomaltose could not be obtained in crystalline form. Also outline a more direct process for preparation of isomaltose.

Abstract in *Jour. soc. chem ind.*, 1892, v. 11, p. 766; *Ber.*, 1892, Jahrg. 25, p. 576R; *Jahresber. Chem.*, 1892, p. 2464.

232–233. —— Zur Gewinnung der Isomaltose aus den Produkten der Stärkeumwandlung durch Diastase. (Zeitschrift für das gesammte Brauwesen, München und Leipzig, 1892, Jahrg. 15, p. 145–146.)

Available in Library of the Chemists' Club.

Is principally a description of the second process in *entry 231*. Potato starch is digested with diastase to a reddish brown iodine reaction and by alcohol precipitations and fermentation a 20% yield of isomaltose is obtained.

Abstract in *Jour. chem. soc.*, 1893, v. 64, p. 5; *Chem. Centr.*, 1892, Bd. 1, p. 886.

234. **Lintner,** Carl J. Zur Frage der Vergärbarkeit von Dextrinen. (Zeitschrift für angewandte Chemie, Berlin, 1892, p. 328–330.) **PKA**

Discusses recent experiments of Medicus and Immerheiser and of Fresenius. Considers that the unfermentable portion of dextrin is composed largely of isomaltose.

Abstract in *Chem. Centr.*, 1892, Bd. 2, p. 221.

235. **Moritz,** E. R., and T. A. Glendinning. Note on diastatic action. (Chemical Society of London, Journal, 1892, v. 61, p. 689–695.) **PKA**

Starch is converted by normal malt diastase to the "resting point," an aliquot portion withdrawn and the sugars determined. Fresh starch is added to the "residual diastase" and, after digestion, the sugars determined as before. Find the activity of the "residual diastase" is almost equal to that of the original. Similar experiments are carried out in which the amount of diastase, the temperature of digestion and the nature of the starch is varied.

Abstract in *Chem. news*, 1892, v. 65, p. 296; *Chem. Centr.*, 1892, Bd. 2, p. 221; *Bull. soc. chim. Paris*, 1893, série 3, tome 10, p. 413.

236. **Morris,** G. Harris. Notes on glucase. (Institute of Brewing, Transactions, London, 1892–93, v. 6, p. 132–142.)

Available in Library of the Patent Office.

Confirms Geduld's observations on the action of glucase on starch and its transformation products (*entry 220*). Contrary to Lintner and Jalowetz finds the enzyme is present only in maize and not in barley.

Abstract in *Jour. soc. chem. ind.*, 1893, v. 12, p. 367.

237. **Prior,** Eugen. Den Einfluss der verschiedenen Temperaturen auf die Beschaffenheit des Malzes und die Zusammensetzung der daraus erhaltenen Würzen. (Abgekürzt.) (Zeitschrift für angewandte Chemie, Berlin, 1892, p. 312–318.) **PKA**

The author states that there is no substance such as maltodextrin in beer worts but that the unfermentable substance present is iso-maltose. Gives equation for the transformation of starch.

Abstract in *Jour. soc. chem. ind.*, 1892, v. 11, p. 766.

Starches and Dextrins, continued.

Enzymic Hydrolysis, continued.

238. Roehmann, F. Die Verzuckerung von Stärke durch Blutserum. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1892, Jahrg. 25, p. 3654–3657.) **PKA**

Glucose and achroodextrin are the chief products.

A mixture of dextrins in the saccharification products is designated as "porphyrodextrin."

Abstract in *Jour. soc. chem. ind.*, 1893, v. 12, p. 366; *Chem. Centr.*, 1893, Bd. 1, p. 350; *Bull. soc. chim. Paris*, 1893, série 3, tome 10, p. 413.

239. Schiffer, Anton. Über die nichtkrystallisierbaren Produkte der Einwirkung der Diastase auf Stärke. (Neue Zeitschrift für Rübenzucker-Industrie, Berlin, 1892, Bd. 29, p. 167–170.)

Available in Library of the Patent Office.

Fails to obtain malto-dextrin according to the directions of Brown, Morris and Herzfeld. Believes their malto-dextrins were mixtures of dextrin and isomaltose. Considers the possibility of the existence of only one dextrin, achroodextrin.

Abstract in *Chem. Centr.*, 1892, Bd. 2, p. 825; *Wag. Jahr.*, 1892, Jahrg. 38, p. 874–878.

240. Senff, Theodor. Beobachtungen über Temperaturen und Wassergehalte des Malzes beim Trocken- und Darrprozesse. (Zeitschrift für das gesammte Brauwesen, München und Leipzig, 1892, Jahrg. 15, p. 197–200, 225–227.)

Available in Library of the Chemists' Club.

Concludes that the action of diastase on soluble starch produces first erythrodextrin, isomaltose and dextrin. Further action of diastase converts the erythrodextrin to maltose while the isomaltose and dextrin remain unchanged.

Also in *Wag. Jahr.*, 1892, Jahrg. 38, p. 861–872.

241. Vuylsteke, Jules. Contribution à l'étude de la diastase. (Académie royale de Belgique, Bulletin, Bruxelles, 1892, série 3, tome 24, p. 577–591.) ***EM**

Studies simultaneous action of amylase and yeast on raw starches and on starch pastes. Heating malt extract at 65° considerably weakens the enzyme although heating dried malt at higher temperatures has no injurious effect.

Abstract in *Zeitschrift für Spiritusindustrie*, Berlin, 1893, N. F., Jahrg. 16, p. 62; *Chem. Centr.*, 1893, Bd. 1, p. 657; *Wag. Jahr.*, 1893, Jahrg. 39, p. 887–891.

242. Windisch, W. Ueber den Einfluss der Diastase auf vergohrenes Bier. (Wochenschrift für Brauerei, Berlin, 1892, Jahrg. 9, p. 621–623.)

Available in Library of the Brewers' Academy.

Abstract in *Wag. Jahr.*, 1892, Jahrg. 38, p. 903.

243. Über die Beurtheilung des Stärkezuckers durch die chemische Analyse. (Zeitschrift für Spiritusindustrie, Berlin, 1892, Jahrg. 15, p. 79–80.)

Available in Library of the Patent Office.

The unfermentable reducing substance present is calculated as iso-maltose.

Abstract in *Jour. soc. chem. ind.*, 1893, v. 12, p. 168.

244. Hiepe, W. L. On some products of starch transformation. (Country brewer's gazette, London, 1893, v. 17, p. 732–734; 1894, v. 18, p. 12–13, 37–40.)

Available in Library of the Brewers' Academy.

Using various yeasts, determines fermentability of isomaltose, prepared by method of Lintner. Finds that amyloins consist of a mixture of glucose, maltose, isomaltose and dextrin.

Abstract in *Jour. soc. chem. ind.*, 1894, v. 13, p. 267; *Chem. Centr.*, 1894, Bd. 1, p. 417.

245. Griessmayer, Viktor. Ueber die Verflüchtigung des Dextrinbegriffes. (Journal für praktische Chemie, Leipzig, 1893, N. F., Bd. 48, p. 225–230.) **PKA**

After reviewing the work for the past 22 years, author concludes that the only dextrins formed by action of diastase on starch are amylo-, malto-, and achroodextrins.

246. Lintner, Carl J. Zur Chemie des Darrens. (Zeitschrift für das gesammte Brauwesen, München und Leipzig, 1893, Jahrg. 16, p. 14–15.)

Available in Library of the Chemists' Club.

Discusses action of diastase and starch during the kiln-drying of malt.

Abstract in *Jour. soc. chem. ind.*, 1893, v. 12, p. 854.

247. —— Über den Abbau der Stärke durch Diastase. (Gesellschaft deutscher Naturforscher und Ärzte, Verhandlungen, Leipzig, 1893, Theil 2, p. 118–122.)

Available in Library of the Academy of Medicine.

A review. Cites evidence against the existence of the so-called "amyloins." Believes the action of diastase results in the formation of 5 compounds, amylodextrin, erythrodextrin, achroodextrin, isomaltose, and maltose.

Abstract in *Chem. Centr.*, 1894, Bd. 2, p. 426.

248. Lintner, Carl J., and GEORG DÜLL. Der Abbau der Stärke unter dem Einflusse der Diastasewirkung. (Deutsche chemische Ge-

Starches and Dextrins, continued.

Enzymic Hydrolysis, continued.

sellschaft, Berichte, Berlin, 1893, Jahrg. 26, p. 2533–2547.) **PKA**

By controlling the diastatic degradation of starch five definite compounds were obtained, namely amylodextrin, erythrodextrin, achroodextrin, isomaltose, and maltose. They were isolated by repeated fractionation with alcohol and their properties determined. A formula is given for the degradation of starch proceeding through four stages. The authors suggest that the amyloins of Brown and Morris are mixtures of dextrin and isomaltose.

Abstract in *Jour. soc. chem. ind.*, 1894, v. 13, p. 53; *Jour. chem. soc.*, 1894, v. 66, part 1, p. 5; *Chem. Centr.*, 1894, Bd. 1, p. 22; *Bull. soc. chim. Paris*, 1894, série 3, tome 12, p. 439–442; *Wag. Jahr.*, 1893, Jahrg. 39, p. 885–887.

249. Roehmann, F. Zur Kenntniss der Isomaltose. (Centralblatt für die medicinischen Wissenschaften, Berlin, 1893, Jahrg. 31, p. 849–850.)

Available in Library of the Academy of Medicine.

Isomaltose is formed by the action of blood serum on starch.

Abstract in *Chem. Centr.*, 1894, Bd. 1, p. 321.

250. Lintner, Carl J. Die Kohlehydrate der Bierwürze und deren Bedeutung für den Vergärungsgrad der Biere. (Auszug.) (Chemisches Central-Blatt, Leipzig, 1894, Bd. 2, p. 655.) **PKA**

The carbohydrates discussed are amylodextrin, erythrodextrin, achroodextrin 1 and 2, isomaltose, and maltose.

251. —— Erwiderung. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1894, Jahrg. 27, p. 293–296.) **PKA**

A reply to Scheibler and Mittelmeier (*entry 447*).

Abstract in *Jour. chem. soc.*, 1894, v. 66, part 1, p. 161; *Bull. soc. chim. Paris*, 1894, série 3, tome 12, p. 585.

252. Lintner, Carl J., and Georg Düll. Über ein zweites bei der Einwirkung von Diastase auf Stärke entstehendes Achroodextrin. (Zeitschrift für das gesammte Brauwesen, München und Leipzig, 1894, Jahrg. 17, p. 339–340.)

Available in Library of the Chemists' Club.

Have obtained a second achroodextrin which resembles the maltodextrin of Brown and Morris.

Also in *Bull. assoc. chimistes*, 1896–97, tome 14, p. 1144–1146.

Abstract in *Jour. chem. soc.*, 1895, v. 68, part 1, p. 409; *Chem. Centr.*, 1894, Bd. 2, p. 864.

253. Munsche, Albert. Über den Einfluss von verschiedenen Maischtemperaturen auf die Bildung von Isomaltose und deren Bestimmung unter Anwendung der physiologischen Methode mittels Hefen Saaz und Frohberg. (Wochenschrift für Brauerei, Berlin, 1894, Jahrg. 11, p. 1372–1377.)

Available in Library of the Brewers' Academy.

Finds isomaltose is formed in largest quantities at 69–71°. Osazones were prepared from the fermented liquids.

Abstract in *Jour. soc. chem. ind.*, 1895, v. 14, p. 590; *Chem. Centr.*, 1894, Bd. 2, p. 1069.

254. Brown, Horace T., and G. Harris Morris. Note on the action, in the cold, of diastase on starch-paste. (Chemical Society of London, Journal, 1895, v. 67, p. 309–313.) **PKA**

Call attention to their earlier work showing the constant relation of opticity and cupric reducing power for all products intermediate between starch and maltose. An apparent discrepancy is removed by a consideration of the "half-rotation" of maltose.

Abstract in *Jour. soc. chem. ind.*, 1895, v. 14, p. 288; *Chem. Centr.*, 1895, Bd. 1, p. 849; *Bull. soc. chim. Paris*, 1896, série 3, tome 16, p. 1006.

255. —— On the "isomaltose" of C. J. Lintner. (Chemical Society of London, Journal, 1895, v. 67, p. 709–738.) **PKA**

Review work on isomaltose. By alcohol precipitation and by fermentation carry out an extensive fractionation of starch hydrolysis products. Investigate fermentability of isomaltose fraction and also composition and crystalline nature of its osazone. Conclude that Lintner's isomaltose is a mixture of maltose and dextrinous compounds of the malto-dextrin or amyloin class.

Abstract in *Chem. news*, 1895, v. 72, p. 45; *Chem. Centr.*, 1895, Bd. 2, p. 438.

256. Duclaux, E. Sur la saccharification de l'amidon. (Institut Pasteur, Annales, Paris, 1895, tome 9, p. 56–64.) **QDA**

A review.

257. Heine, L. Der physiologische Abbau von Amylum und Glykogen. Ein Überblick über die neueren, den Kohlehydratstoffwechsel betreffenden Arbeiten. (Fortschritte der Medicin, Berlin, 1895, Jahrg. 13, p. 789–800.)

Available in Library of the Academy of Medicine.

Abstract in *Chem. Centr.*, 1896, Bd. 1, p. 118–119.

258. Jalowetz, Ed. Isomaltose. (Chemiker-Zeitung, Cöthen, 1895, Jahrg. 19, p. 2003.) †† **VOA**

Studies osazones of maltose. Concludes that isomaltose is not present among starch transformation products.

Abstract in *Jour. chem. soc.*, 1896, v. 70, part 1, p. 405; *Chem. Centr.*, 1895, Bd. 2, p. 1120.

Starches and Dextrins, continued.

Enzymic Hydrolysis, continued.

259. Kuelz, E., and J. Vogel. Welche Zuckerarten entstehen bei dem durch thierische Fermente bewirkten Abbau der Stärke und des Glykogens? (Zeitschrift für Biologie, München und Leipzig, 1895, Bd. 31, p. 108–124.) **QAA**

By the action of animal diastases on rice starch obtains maltose, iso-maltose and dextrose in varying quantities. Identifies the sugars by determining the composition of their osazones.

Abstract in *Jour. chem. soc.*, 1894, v. 66, part 2, p. 325; *Chem. Centr.*, 1894, Bd. 1, p. 1004.

260. Ling, Arthur R., and Julian L. Baker. Action of diastase on starch. Preliminary notice. (Chemical Society of London, Journal, 1895, v. 67, p. 702–708.) **PKA**

They isolate a substance having roughly the properties of Lintner's "isomaltose." However, acetylation yields almost half its weight of octacetylmaltose. An osazone derived from a hexatriose is also obtained from starch conversion products.

Abstract in *Jour. soc. chem. ind.*, 1895, v. 14, p. 175; *Chem. Centr.*, 1895, Bd. 1, p. 635; *Bull. soc. chim. Paris*, 1896, série 3, tome 16, p. 650–652.

261. —— Action of diastase on starch. Second notice. (Chemical Society of London, Journal, 1895, v. 67, p. 739–746.) **PKA**

Give further evidence that glucose is formed in the conversion of starch by kiln dried malt and that Lintner's isomaltose is a mixture of maltose and a simple dextrin. The triosazone which they have previously obtained (*entry 260*), is shown to be an osazone of a compound obtained by interaction of glucose and this simple dextrin.

Abstract in *Chem. Centr.*, 1895, Bd. 2, p. 438; *Bull. soc. chim. Paris*, 1896, série 3, tome 16, p. 652–654.

262. Lintner, Carl J. Isomaltose und Dextrin. (Zeitschrift für das gesammte Brauwesen, München und Leipzig, 1895, Jahrg. 18, p. 70–71.)

Available in Library of the Chemists' Club.

A reply to Ling and Baker (*see entry 260*). Their work is regarded as a confirmation of the presence of isomaltose among the diastatic conversion products of starch.

Abstract in *Chem. Centr.*, 1895, Bd. 1, p. 742.

263. —— Über Isomaltose. (Zeitschrift für das gesammte Brauwesen, München und Leipzig, 1895, Jahrg. 18, p. 173–174.)

Available in Library of the Chemists' Club.

Finds an α and β isomaltose among the diastatic hydrolytic products of starch. The two isomers differ only in their fermentability by Saaz and Frohberg yeasts.

Abstract in *Chem. Centr.*, 1895, Bd. 2, p. 85.

264. —— Entgegnung auf die Mitteilung von Brown und Morris über die Nichtexistenz der Isomaltose. (Zeitschrift für das gesammte Brauwesen, München und Leipzig, 1895, Jahrg. 18, p. 233–235.)

Available in Library of the Chemists' Club.

Author maintains that Brown and Morris (*entry 255*) did not obtain pure isomaltose. The amyloins they have obtained are probably mixtures of dextrin and isomaltose.

Abstract in *Chem. Centr.*, 1895, Bd. 2, p. 439.

265. Mittelmeier, Hans. Ueber bei der Verzuckerung der Stärke entstehende "Metamaltose" sowie über "primäre" und "sekundare" Dextrine. (Wochenschrift für Brauerei, Berlin, 1895, Jahrg. 12, p. 480–482.)

Available in Library of the Brewers' Academy.

Considers that the transformation of starch proceeds in two stages, primary dextrins being formed in the earlier and secondary dextrins in the latter stage. By hydrolysis of the secondary dextrins obtains a new biose termed metamaltose.

Abstract in *Jour. chem. soc.*, 1896, v. 70, part 1, p. 336; *Chem. Centr.*, 1895, Bd. 2, p. 163; *Wag. Jahr.*, 1895, Jahrg. 41, p. 796.

266. Ulrich, C. Über die Isomaltose. (Chemiker-Zeitung, Cöthen, 1895, Jahrg. 19, p. 1523–1524.) **†† VOA**

Evidence that incomplete hydrolysis of starch by malt forms maltose and not isomaltose.

Abstract in *Jour. soc. chem. ind.*, 1895, v. 14, p. 878; *Jour. chem. soc.*, 1896, v. 70, part 1, p. 335.

267. Buelow, K. Über die dextrinartigen Abbauprodukte der Stärke. (Archiv für die gesamte Physiologie des Menschen und der Tiere, Pflüger's, Bonn, 1896, Bd. 62, p. 131–155.) **QCA**

Obtains amylodextrin by action of KOH on potato starch; this product is similar to the amylodextrin obtained by the action of diastase or acids. By the action of diastase, also obtains erythro- and achroodextrins. The barium hydroxide compound of each dextrin is prepared.

Abstract in *Jour. chem. soc.*, 1896, v. 70, part 1, p. 273; *Chem. Centr.*, 1895, Bd. 2, p. 919; *Wag. Jahr.*, 1896, Jahrg. 42, p. 773–774.

268. Chlodounsky, K., and O. Sulc. Saccharification der Stärke durch Pankreasfermente. (Auszug.) (Jahres-Bericht über die Fortschritte der Thier-Chemie, Wiesbaden, 1896, Bd. 26, p. 67–68.) **PKA**

Starch paste was subjected to the action

Starches and Dextrins, continued.

Enzymic Hydrolysis, continued.

of an extract of pancreas for 18 days at 38°. The unchanged starch was separated by filtration and various dextrin fractions obtained from the filtrate by precipitation with alcohol.

269. Petit, Paul. L'action de la diastase sur l'amidon. (Société chimique de Paris, Bulletin, 1896, série 3, tome 15, p. 132.) **PKA**

Determines mathematical relation between temperature and amount of maltose formed.

Abstract in *Chem. Centr.*, 1896, Bd. 1, p. 588.

270. Prior, Eugen. Über ein drittes Diastase-Achroodextrin und die Isomaltose. (Centralblatt für Bakteriologie, Parasitenkunde und Infektionskrankheiten, Jena, 1896, Abteilung 2, Bd. 2, p. 271–273.) **QDA**

By the incomplete saccharification of potato starch with green malt, obtains a product which is termed achroodextrin 3. The isomaltoses are regarded as mixtures of achroodextrin 3 and maltose.

Abstract in *Jour. chem. soc.*, 1897, v. 72, part 1, p. 312; *Chem. Centr.*, 1896, Bd. 2, p. 86.

271. —— Leicht und schwer vergärbare Kohlehydrate. (Forschungs-Berichte über Lebensmittel, München, 1896, Jahrg. 3, p. 322–324.)

Available in Library of the Department of Agriculture.

Evidence that the supposed existence of isomaltose in starch conversion products has been due to the presence of "achroodextrin III," which the author has isolated and described.

Abstract in *Jour. soc. chem. ind.*, 1896, v. 15, p. 915; *Chem. Centr.*, 1896, Bd. 2, p. 907.

272. Stone, Winthrop E. Action of enzymic ferments on starches of different origin. (United States. — Office of Experiment Stations, Bulletin, Washington, 1896, no. 34, p. 29–44.) **VPG**

The time required for complete solution or saccharification is 80 times greater for some starches than for others.

Abstract in *Jour. chem. soc.*, 1897, v. 72, part 2, p. 461; *Chem. Centr.*, 1897, Bd. 1, p. 853; *Bull. assoc. chim.*, 1897–98, tome 15, p. 843.

273. Brown, Horace T., and others. Experimental methods employed in the examination of the products of starch-hydrolysis by diastase. By Horace T. Brown, G. Harris Morris, and J. H. Millar. (Chemical Society of London, Journal, 1897, v. 71, p. 72–108.) **PKA**

Section 1. Estimation of solids from solution-density.

Section 2. Determination of specific rotatory power.

Section 3. The relation of alpha j to alpha d.

Section 4. Determination of cupric-reducing power.

Section 5. Limits of accuracy of the methods.

Abstract in *Jour. soc. chem. ind.*, 1897, v. 16, p. 165; *Chem. Centr.*, 1897, Bd. 1, p. 366, 584.

Duplicate summaries in *Moniteur scientifique du docteur Quesneville*, 1897, v. 50, p. 776–779; *Bull. assoc. chimistes*, 1897–98, tome 15, p. 733–738.

274. —— The relation of the specific rotatory and cupric-reducing powers of the products of starch-hydrolysis by diastase. By H. T. Brown, G. Harris Morris, and J. H. Millar. (Chemical Society of London, Journal, 1897, v. 71, p. 115–123.) **PKA**

Plotting specific rotatory power against cupric reducing power for 70 different hydrolytic stages or fractions, they find a close adherence to a linear function. Recalculating the supposedly contradictory results of Lintner and Düll and of Ost they do not find wide variations, except in the case of "isomaltose."

Abstract in *Jour. soc. chem. ind.*, 1897, v. 16, p. 166; *Chem. Centr.*, 1897, Bd. 1, p. 367; *Bull. soc. chim. Paris*, 1897, série 3, tome 18, p. 936.

275. Brown, Horace T., and Spencer U. Pickering. Thermo-chemistry of carbohydrate hydrolysis. (1) Hydrolysis of starch by vegetable and animal diastase. (Chemical Society of London, Journal, 1897, v. 71, p. 783–795.) **PKA**

The first attempt to determine directly the thermal effects of hydrolysis. Malt diastase, pancreatic diastase, takadiastase and saliva are used as hydrolytic agents.

Abstract in *Jour. soc. chem. ind.*, 1897, v. 16, p. 624; *Chem. Centr.*, 1897, Bd. 2, p. 169; *Bull. soc. chim. Paris*, 1897, série 3, tome 18, p. 1062.

276. Fuchs, J. Zur Prüfung auf Verzuckerung der Maischen. (Zeitschrift für das gesammte Brauwesen, München und Leipzig, 1897, Jahrg. 20, p. 203–204.) **† VTRA**

The point of complete disappearance of starch is more sharply defined by carrying out the iodine test on a small, dry plate of gypsum.

Abstract in *Jour. soc. chem. ind.*, 1897, v. 26, p. 563.

277. Ling, Arthur R., and Julian L. Baker. Action of diastase on starch. (Chemical Society of London, Journal, 1897, v. 71, p. 508–522.) **PKA**

The limited action of diastase on starch results in the formation of maltose, maltodextrin α, maltodextrin β, and a simple dextrin isomeric with maltose.

Abstract in *Jour. soc. chem. ind.*, 1897, v. 16, p. 154; *Chem. Centr.*, 1897, Bd. 1, p. 461; *Bull. soc. chim. Paris*, 1897, série 3, tome 18, p. 1354.

Starches and Dextrins, continued.

Enzymic Hydrolysis, continued.

278. **Mittelmeier,** Hans. Contribution à l'étude de l'action diastatique de l'amidon. (Moniteur scientifique du docteur Quesneville, Paris, 1897, v. 50, p. 773–776.) **OA**

Considers that the first stage of hydrolysis results in the formation of two different amylodextrins, one of which is more resistant to diastase than the other. Has obtained an osazone apparently derived from an isomeride of maltose.

Reprinted in *Bull. assoc. des chimistes,* 1897–98, tome 15, p. 728–733.

Abstract in *Jour. chem. soc.,* 1898, v. 74, part 1, p. 461; *Chem. Centr.,* 1897, Bd. 2, p. 1010.

279. **Petit,** Paul. Produits de saccharification de l'amidon par la diastase. (Académie des sciences, Comptes rendus, Paris, 1897, tome 125, p. 355–357.) ***EO**

Hydrolyzes starch at 70° with 1% diastase until a constant red coloration with iodine is obtained. Determines properties of the dextrin isolated at this stage.

Abstract in *Jour. soc. chem. ind.,* 1897, v. 16, p. 1028; *Jour. chem. soc.,* 1898, v. 74, part 1, p. 118; *Chem. Centr.,* 1897, Bd. 2, p. 574; *Bull. soc. chim. Paris,* 1897, série 3, tome 17, p. 959.

280. **Sigmond,** Elek von. Beiträge zur Einwirkung der Diastase auf unverkleisterte Stärke. (Wochenschrift für Brauerei, Berlin, 1897, Jahrg. 14, p. 412.) **† VTRA**

Determines temperature of gelatinization and solution for a number of starches. Results do not coincide with those of Lintner.

Abstract in *Jour. chem. soc.,* 1898, v. 74, part 1, p. 398; *Chem. Centr.,* 1897, Bd. 2, p. 614; *Jour. soc. chem. ind.,* 1897, v. 16, p. 817; *Wag. Jahr.,* 1897, Jahrg. 43, p. 791, 928.

281. **Cluss,** H., and H. Feber. Beiträge zur Anwendung der Antiseptiko in der Brennerei. (Zeitschrift für Spiritusindustrie, Berlin, 1898, N. F., Jahrg. 21, p. 2–3.)

Available in Library of the Patent Office.

Aluminium fluoride was a more satisfactory antiseptic than the other fluorides. With worts prepared from potatoes and maize the fermentations were free from acid and the action of yeast or diastase was not interfered with.

Abstract in *Jour. soc. chim. ind.,* 1898, v. 17, p. 258.

282. **Duclaux,** E. Lois générales de l'action des diastases. (Institut Pasteur, Annales, Paris, 1898, tome 12, p. 96–127.) **QDA**

Abstract in *Chem. Centr.,* 1898, Bd. 1, p. 899.

283. **Henderson,** J. Contributions to our knowledge of the dextrins. (Abstract.) (Society of Chemical Industry, Journal, London, 1898, v. 17, p. 591.) **VOA**

Prepares "erythrodextrin 2" and two which are probably achroodextrin 1 and 2. Presents evidence that the same dextrins are formed by acids as by diastase. Recommends fermentation of malt extract to remove substances possessing the optical rotatory and cupric reducing power.

284. **Jalowetz,** Ed., and L. Hubert. Zur Kenntniss des Stärkeabbaues beim Maischprocesse. (Internationaler Congress für angewandte Chemie, 3d, Wien, 1898, Bericht, Bd. 1, p. 63–66.) **PKR**

Abstract in *Wag. Jahr.,* 1899, Jahrg. 45, p. 852–853.

285. **Tollens,** Bernhard. On the carbohydrates of barley and malt, with special reference to the pentosans. The behaviour of the pentosans during the preparation of malt, and during mashing and fermentation. (Federated Institutes of Brewing, Journal, London, 1898, v. 4, p. 438–454.) **VTRA**

Starch, as the main constituent of barley, is mentioned briefly and its hydrolytic products discussed.

Abstract in *Jour. soc. chem. ind.,* 1898, v. 17, p. 1062.

286. **Pottevin,** Henri. Sur la saccharification de l'amidon par l'amylase du malt. (Académie des sciences, Comptes rendus, Paris, 1898, tome 126, p. 1218–1221.) ***EO**

Describes experiments showing that (1) the conversion into maltose takes place in two distinct stages; (2) the difference between the dextrins is merely one of physical state; and (3) the different parts of the starch granules differ in ease with which they are converted into dextrin.

Abstract in *Jour. soc. chim. ind.,* 1898, v. 17, p. 590; *Jour. chem. soc.,* 1898, v. 74, part 1, p. 551; *Chem. Centr.,* 1898, Bd. 1, p. 1228; *Bull. assoc. chimistes,* 1898–99, tome 16, p. 48; *Bull. soc. chim. Paris,* 1898, série 3, tome 19, p. 734.

287. **Brown,** Horace T., and J. H. Millar. Maltodextrin; its oxidation-products and constitution. (Chemical Society of London, Journal, 1899, v. 75, p. 286–308.) **PKA**

The enzymic hydrolysis of starch is carried to the proper stage and the maltodextrin separated by a series of precipitations with alcohol. The product has a rotation of alpha D equal 181–183° and cupric reducing power of R equal 42–43; is not fermentable, yields no osazone, is completely resolvable into maltose by amylase and into glucose by acids. Maltodextrinic acid A is prepared by the oxidation of the maltodextrin by mercuric oxide and barium hydroxide; it is hydrolyzed by amylase giving maltose and maltodextrinic acid B, which is of lower complexity. Both dextrinic acids on hydrolysis with acid yield glucose and a 5 carbon acid similar to xylonic acid. Gives possible constitutional formulas for the

Starches and Dextrins, continued.
Enzymic Hydrolysis, continued.

above reactions and discusses the reversion of sugars in acid hydrolysis.

Abstract in *Jour. soc. chem. ind.*, 1899, v. 18, p. 159; *Chem. Centr.*, 1899, Bd. 1, p. 674, 1108; *Bull. soc. chim. Paris*, 1899, série 3, tome 22, p. 795–797; *Wag. Jahr.*, 1899, Jahrg. 45, p. 844.

288. —— The stable dextrin of starch transformations, and its relation to the maltodextrins and soluble starch. (Chemical Society of London, Journal, 1899, v. 75, p. 315–337.) **PKA**

During enzymic hydrolysis, a definite resting stage is reached at the point α_D=150° and R=80; there is separated from this stage an achroodextrin, which is very resistant to enzymic action, with α_D=195–196° and R=5.5–5.9. The corresponding acid, dextrinic acid, is obtained by the action of mercuric oxide and barium hydroxide, and is purified by the formation of the nitrate and regeneration by ammonium sulphide. The calcium salt contains .29% calcium. The dextrinic acid, on hydrolysis gives glucose and a 5 carbon acid, similar to that obtained from the maltodextrinic acids A and B (see previous entry). The stable dextrin is slowly hydrolyzed by amylase, giving, simultaneously, equal amounts of maltose and dextrose. The constitution of the starch molecule is discussed in the light of this new work.

Abstract in *Jour. soc. chem. ind.*, 1899, v. 18, p. 159; *Chem. Centr.*, 1899, Bd. 1, p. 674; *Bull. soc. chim. Paris*, 1899, série 3, tome 22, p. 798–799.

289. Ehrlich, C. Ueber Kleistertrübungen. (Allgemeine Zeitschrift für Bierbrauerei und Malzfabrikation, Wien, 1899, Jahrg. 17, p. 806–808.)

Available in Library of the Brewers' Academy.

Beer, which has been shown to contain starch, is treated with cold malt extract for a period of eight days.

Abstract in *Jour. soc. chem. ind.*, 1899, v. 18, p. 1043.

290. Petit, Paul. Sur les dextrines de saccharification. (Académie des sciences, Comptes rendus, Paris, 1899, tome 128, p. 1176–1178.) ***EO**

The dextrin, previously isolated (*entry 279*), has the constants $\alpha_D = 166.6°$, R = 18, molecular weight=485, and baryta compound contains 21.7% barium. The dextrin is further hydrolyzed by diastase to maltose and a dextrin; it is partially converted to maltose by certain fungi and also by an extract of yeast.

Abstract in *Jour. soc. chem. ind.*, 1899, v. 18, p. 695; *Jour. chem. soc.*, 1899, v. 76, part 1, p. 559; *Chem. Zentr.*, 1899, Bd. 1, p. 1272; *Bull. soc. chim. Paris*, 1899, série 3, tome 21, p. 702.

291. Pottevin, Henri. La saccharification de l'amidon. (Institut Pasteur, Annales, Paris, 1899, tome 13, p. 665–688.) **QDA**

Separates amylodextrin, by precipitation with alcohol, into "α amylodextrin" and "β amylodextrin." Gives experimental evidence that diastase is composed of two enzymes, one capable of converting starch to dextrin and the other, dextrin to maltose. Microscopic examination shows that, even after gelatinization, the starch granules are not uniform, causing an uneven rate of saccharification and leaving a stable, residual dextrin.

Condensed in *Wag. Jahr.*, 1899, Jahrg. 45, p. 836–844.

Abstract in *Jour. soc. chem. ind.*, 1899, v. 18, p. 1145; *Jour. chem. soc.*, 1900, v. 78, part 1, p. 80; *Chem. Centr.*, 1899, Bd. 2, p. 644; *Bull. soc. chim. Paris*, 1900, série 3, tome 23, p. 348–350.

292. —— Sur la maltodextrine. (Institut Pasteur, Annales, Paris, 1899, tome 13, p. 728–734.) **QDA**

Fractionates a dextrin closely resembling the "maltodextrin" of Brown and Morris, and confirms their observation that it was unfermentable. Prepares a mixture of maltose and a non-reducing dextrin which was identical. Shows that mixtures of the more soluble dextrins may diffuse unchanged. Separates maltodextrin into two components by precipitation with alcohol.

Abstract in *Jour. soc. chem. ind.*, 1899, v. 18, p. 1145; 1900, v. 19, p. 162; *Chem. Centr.*, 1899, Bd. 2, p. 864; *Bull. soc. chim. Paris*, 1900, série 3, tome 23, p. 238.

293. —— Sur l'isomaltose. (Institut Pasteur, Annales, Paris, 1899, tome 13, p. 796–800.) **QDA**

Isomaltose is believed to be a mixture of maltose and dextrin. However, the dextrin constituent is not maltodextrin but a non-reducing dextrin of the more soluble type.

Abstract in *Jour. chem. soc.*, 1900, v. 78, part 1, p. 77; *Jour. soc. chem. ind.*, 1900, v. 19, p. 162; *Chem. Centr.*, 1899, Bd. 2, p. 1023; *Bull. soc. chim. Paris*, 1900, série 3, tome 23, p. 128.

294. Fernbach, Auguste. État actuel de nos connaissances sur la saccharification de l'amidon. (Congrès international de chimie applique, 4th, Paris, 1900, Compte rendu in-extenso, tome 2, p. 287–292.) **PKR**

A general discussion.

295. —— Verzuckerung der Stärke durch Malzdiastase. (Abgekürzt.) (Wochenschrift für Brauerei, Berlin, 1900, Jahrg. 17, p. 34–37.) **VTRA**

Finds the presence of acid phosphates favorable to amylolytic action. With a comparatively high content of phosphates in malt, addition of free acid is not harmful, due to conversion of phosphates to the favorable acid phosphate. The slightest excess

Starches and Dextrins, continued.

Enzymic Hydrolysis, continued.

of free acid, however, causes a marked inhibition in amylolytic action.

Abstract in *Jour. soc. chem. ind.*, 1900, v. 19, p. 260; *Wag. Jahr.*, 1900, Jahrg. 46, p. 380. Condensed in *Zeitschrift für das gesammte Brauwesen*, 1900, Jahrg. 23, p. 67–69.

296. Petit, Paul. Sur les dextrines de saccharification. (Académie des sciences, Comptes rendus, Paris, 1900, tome 131, p. 453–455.) ***EO**

Prepares dextrins by saccharification of starch at 50°, 60° and 70°. Determines their reducing power, specific rotation, molecular weight by cryoscopic methods and behavior towards amylase. The latter results vary greatly with the age of the preparation and the manner in which it has been preserved.

Abstract in *Jour. soc. chem. ind.*, 1900, v. 19, p. 917; *Chem. Centr.*, 1900, Bd. 2, p. 666; *Bull. assoc. chimistes*, 1901–02, tome 19, p. 442; *Bull. soc. chim. Paris*, 1900, série 3, tome 23, p. 862.

297. Pottevin, Henri. Die Verzuckerung der Stärke. (Zeitschrift für Spiritusindustrie, Berlin, 1900, Jahrg. 23, p. 2, 10–11, 73, 213, 248.)

Available in Library of the Patent Office.

Shows that the marked decrease in rate of saccharification after the first few minutes is not due to the weakening of the enzyme, nor to the inhibitive influence of the products formed, but to the non-uniformity of the starch granules. Starch paste is not homogeneous and the denser portions are more resistant to hydrolysis. The dextrins from these denser portions constitute the residual dextrins of the ordinary transformation.

Abstract in *Jour. soc. chem. ind.*, 1900, v. 19, p. 162; *Wag. Jahr.*, 1900, Jahrg. 46, p. 388.

298. Prior, Eugen, and D. Wiegman. Darstellung und Eigenschaften des Diastase-achroodextrins. 3. (Zeitschrift für angewandte Chemie, Berlin, 1900, p. 464–469.) **PKA**

Potato starch was saccharified by amylase to a faint erythrodextrin reaction, the mixture fermented and fractionated with alcohol; "achroodextrin 3" was obtained, which is identical with the "maltodextrin β" of Ling and Baker. It is nearly insoluble in 90% alcohol, gives no trace of crystalline osazone, α_D=171.1°, R=42.5, molecular weight by freezing point method is 642, it is fermented completely by logos yeast, although the yeast contains no enzyme capable of saccharifying the dextrin. Gives evidence that it is an individual substance. Erythrodextrin and achroodextrin 2 were also isolated.

Condensed in *Wag. Jahr.*, 1900, Jahrg. 46, p. 385–387; *Chem. Centr.*, 1900, Bd. 1, p. 1270–1272.
Abstract in *Jour. chem. ind.*, 1900, v. 19, p. 549–550; *Jour. chem. soc.*, 1900, v. 78, p. 541.

299. Maszewski, T. Ueber einige Bedingungen der Ptyalinwirkung. (Zeitschrift für physiologische Chemie, Hoppe-Seyler's, Strassburg, 1900–01, Bd. 31, p. 58–63.) **PKA**

With a constant concentration of ptyalin and an increasing concentration of starch there is an increase in the production of sugar. With a constant concentration of starch and an increasing quantity of ptyalin, no increase in sugar formation was noted.

Abstract in *Bull. soc. chim. Paris*, 1901, série 3, tome 26, p. 332.

300. Windisch, W. Lässt sich der Mälzungsschwand ohne Nachtheile für die Qualität des Malzes verringern? (Wochenschrift für Brauerei, Berlin, 1900, Jahrg. 17, p. 265–267.) **† VTRA**

Discusses briefly the retarding action of saccharification products on diastatic activity.

301. Morris, G. Harris. The combined action of diastase and yeast on starch-granules. (Chemical Society of London, Journal, 1901, v. 79, p. 1085–1089.) **PKA**

The quantity of starch going into solution in the presence of yeast and diastase is three times as great as in the presence of diastase alone.

Abstract in *Chem. Centr.*, 1901, Bd. 2, p. 436; *Bull. soc. chim. Paris*, 1902, série 3, tome 28, p. 44; *Wag. Jahr.*, 1901, Jahrg. 47, p. 426–428.

302. Baker, Julian L. The action of ungerminated barley diastase on starch. Part one. (Chemical Society of London, Journal, 1902, v. 81, p. 1177–1185.) **PKA**

Soluble starch is acted upon by the barley diastase to form glucose, maltose and "α amylodextrin." The dextrin gives a blue iodine reaction, α_D = 190–195°, R = .56–2, and is very resistant to further action of barley diastase. There is no evidence of any dextrin of less complexity. It is shown that the glucose, which appears only after prolonged hydrolysis, has its genesis in the dextrin and not the maltose.

Abstract in *Jour. soc. chem. ind.*, 1902, v. 21, p. 1087; *Bull. soc. chim. Paris*, 1903, série 3, tome 30, p. 377; *Chem. Centr.*, 1902, Bd. 2, p. 191.

303. Brown, Horace T., and T. A. Glendinning. The velocity of hydrolysis of starch by diastase, with some remarks on enzyme action. (Chemical Society of London, Journal, 1902, v. 81, p. 388–400.) **PKA**

Using 3% starch solutions as substrate, follow course of reaction by determining sugars formed. Conclude that the amount of hydrolysis, up to 36%, is very nearly a linear function of the time and beyond that point it is approximately logarithmic.

Abstract in *Jour. soc. chem. ind.*, 1902, v. 21, p. 419; *Chem. Centr.*, 1902, Bd. 1, p. 770; *Bull. soc. chim. Paris*, 1902, série 3, tome 28, p. 765.

Starches and Dextrins, continued.

Enzymic Hydrolysis, continued.

304. **Clemm,** Walther Nic. Zur Frage der Kohlehydratzerlegung durch tierische und pflanzliche Fermente und Enzyme. (Archiv für das gesammte Physiologie, Pflüger's, Bonn, 1902, Bd. 89, p. 517–526.) **QCA**

Potato starch is treated with filtered saliva, with malt extract and with pancreatin preparations and the resulting sugars identified by means of their osazones.

Abstract in *Jour. chem. soc.*, 1902, v. 82, part 1, p. 348; *Chem. Centr.*, 1902, Bd. 1, p. 943.

305. **Hill,** Arthur Croft. Taka-diastase and reversed ferment action. (Chemical Society of London, Proceedings, 1902, v. 17, p. 184.) **PKA**

Taka-diastase completely hydrolyses dilute starch solutions to glucose, there being sufficient maltase in commercial taka-diastase to convert all maltose to glucose.

306. **Ling,** Arthur R. Malt analysis. (Federated Institutes of Brewing, Journal, London, 1902, v. 8, p. 441–456.) **VTRA**

Includes discussion on determination of diastatic activity of malts. Experimental evidence that Kjeldahl's law of proportionality does not hold for the diastase of air-dried malt.

Abstract in *Jour. soc. chem. ind.*, 1902, v. 21, p. 983; *Chem. Centr.*, 1902, Bd. 2, p. 1020.

307. **Ling,** Arthur R., and Bernard F. Davis. Some experiments on malt diastase. (Federated Institutes of Brewing, Journal, London, 1902, v. 8, p. 475–500.) **VTRA**

Diastase, which had been dried at ordinary temperatures, was allowed to act on starch paste at 50°–60° for 42 hours, the only product being maltose. The action of diastase, previously heated in solution to 70°, is considerably slower and glucose is one of the products. The action of diastases, heated at other temperatures both in the wet and dry states, was investigated. Discussion follows.

Abstract in *Jour. chem. soc.*, 1902, v. 82, part 1, p. 732; *Jour. soc. chem. ind.*, 1902, v. 21, p. 1088; *Chem. Centr.*, 1902, Bd. 2, p. 1223; *Wag. Jahr.*, 1903, Jahrg. 49, Abt. 2, p. 367.

308. **Syniewski,** Wiktor. Ueber die Constitution der Stärke. (Liebig's Annalen der Chemie, Leipzig, 1902, Bd. 324, p. 212–268.) **PKA**

Starch is hydrolyzed by malt extract, prepared at a temperature of 77°, until there appears a marked lag in the hydrolysis; by precipitation with 90% alcohol, a dextrin, "grenzdextrin II", is separated, which is moderately soluble in dilute alcohol, $\alpha_D = 179°$, $R = 30(M)$, and molecular weight by freezing point = 1039. The dextrin is readily hydrolyzed by unheated malt extract, forming maltose and maltodextrin, the latter having a molecular weight by freezing point = 595, $\alpha_D = 172°$ and $R = 42.7(M)$.

"Grenzdextrin I," the residual dextrin formed by successive actions of heated and unheated malt extracts on starch, is very slowly hydrolyzed to dextrose, maltose and isomaltose, the latter having an $\alpha_D = 141°$, $R = 84.5(M)$, is fermentable by yeast, its osazone melts at 153°, and it is given the term, dextrinose.

An acetyl derivative and an inversion product of amylodextrin were prepared.

Discusses at length the constitution of the starch molecule in terms of these observations.

Abstract in *Jour. chem. soc.*, 1903, v. 84, part 1, p. 69–72; *Jour. soc. chem. ind.*, 1902, v. 21, p. 1341; *Chem. Centr.*, 1902, Bd. 2, p. 984–986.

309. **Windisch,** W., and R. Hasse. Über den Verlauf des Stärke- und Eiweissabbaues während des Maischprozesses. (Wochenschrift für Brauerei, Berlin, 1902, Jahrg. 19, p. 192–194.) **† VTRA**

Finds saccharification is very rapid at 62.5°. Subsequent saccharification at 70° results in a smaller production of maltose and larger production of dextrin.

Abstract in *Jour. soc. chem. ind.*, 1902, v. 21, p. 557.

310. **Ling,** Arthur R. Action of diastase on the starch granules of raw and malted barley. (British Association for the Advancement of Science, Report, London, 1903, p. 603–604.) *** EC**

Barley and malt starches, unlike potato starch, are attacked by diastase without being previously gelatinized. The author shows a wide difference in the constants yielded by the various starches, when subjected to equal diastatic action.

Reprint in *Jour. soc. chem. ind.*, 1903, v. 22, p. 1058.

Abstract in *Chem. Centr.*, 1903, Bd. 2, p. 1222.

311. —— Action of malt diastase on potato starch paste. (British Association for the Advancement of Science, Report, London, 1903, p. 604.) *** EC**

Isolated products of diastatic action yield a proportion of glucose when submitted to the further action of unrestricted diastase. Thus, maltodextrin is shown to yield 10% glucose. Suggests that the reversion of glucose results in the isomaltose, which is present at the end of hydrolysis.

Reprint in *Jour. soc. chem. ind.*, 1903, v. 22, p. 1059; *Chem. Centr.*, 1904, Bd. 1, p. 901.

312. —— Starch conversion in the mash tun. (Federated Institutes of Brewing, Journal, London, 1903, v. 9, p. 446–461.) **VTRA**

Glucose is produced by the prolonged action on starch paste of diastase which has

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been heated in aqueous solution above 60°, but has never been observed in starch conversions made with unrestricted diastase. On continuing to heat the mixed products at the conversion temperature, the glucose diminishes in amount, although glucose and diastase heated alone effect no reversion.

Abstract in *Jour. soc. chem. ind.*, 1903, v. 22, p. 1204; *Jour. chem. soc.*, 1904, v. 86, part 1, p. 558.

313. **Moreau,** J. Étude expérimentale de la marche de la saccharification de l'amidon. (Société royale des sciences médicales et naturelles, Annales, Bruxelles, 1903, année 64, tome 12, fasc. 3, 116 p.)

Available in Library of the Academy of Medicine.

Amylo- and erythrodextrin are precipitated in aqueous solution by barium hydroxide, while achroodextrin and sugars are precipitated only in the presence of alcohol. Using this as a method of analysis, finds that starch is acted upon by the usual hydrolytic agents, producing all three dextrins and sugar even in the earliest stages of the reaction. Prepares a non-reducing amylo- and erythrodextrin, but is unable to fractionate achroodextrin free from reducing sugar.

Abstract in *Jour. soc. chem. ind.*, 1905, v. 24, p. 204; *Chem. Centr.*, 1905, Bd. 1, p. 863.

314. **Davis,** Bernard F., and Arthur R. Ling. Action of malt diastase on potato-starch paste. (Chemical Society of London, Journal, 1904, v. 85, p. 16–29.) PKA

Further evidence that the action of restricted diastase upon starch produces glucose and that the same diastase produces no glucose from maltose. Also that the glucose in the hydrolyzed solution diminishes if the conversion temperature is maintained.

Abstract in *Jour. soc. chem. ind.*, 1903, v. 22, p. 1058; *Chem. Centr.*, 1904, Bd. 1, p. 736; *Bull. soc. chim. Paris*, 1904, série 3, tome 32, p. 991.

315. **Ford,** John S. Note on the hydrolysis of starch by diastase. (Chemical Society of London, Journal, 1904, v. 85, p. 980–983.) PKA

Transformations are carried out at 16°, 20°, 40° and 56°. The results show that Kjeldahl's law of proportionality holds closely for the diastase in extracts of barley and air dried malt.

Abstract in *Jour. soc. chem. ind.*, 1904, v. 23, p. 875; *Chem. Centr.*, 1904, Bd. 2, p. 825.

316. **Ost,** H. Die Isomaltose. (Zeitschrift für angewandte Chemie, Berlin, 1904, Jahrg. 17, p. 1663–1670.) PKA

Further evidence against the existence of isomaltose among starch hydrolysis products.

Abstract in *Jour. chem. soc.*, 1905, v. 88, part 1, p. 22; *Chem. Centr.*, 1904, Bd. 2, p. 1712.

317. **O'Sullivan,** James. A comparison of the products of the hydrolysis of potato starch with those obtained from cereal starches. (Chemical Society of London, Journal, 1904, v. 85, p. 616–623.) PKA

Starches of six different origins are mixed with water and heated to 97° for five minutes. The pastes are subjected to enzymic action under six different conditions. In each case a much lower percentage of maltose is obtained from the potato starch. Concludes that the percentage composition of the products of other starches cannot be inferred from results obtained with potato starch.

Abstract in *Jour. soc. chem. ind.*, 1904, v. 23, p. 449; *Chem. Centr.*, 1904, Bd. 1, p. 1254; *Bull. assoc. chimistes*, 1905–06, tome 23, p. 594; *Bull. soc. chim. Paris*, 1904, série 3, tome 32, p. 1175.

318. **Fernbach,** Auguste, and Jules Wolff. Influence de l'état de liquéfaction de l'amidon sur sa transformation par les diastases saccharifiantes. (Académie des sciences, Comptes rendus, Paris, 1905, tome 140, p. 1067–1069.) *EO

Saccharogenic action is investigated by using barley extract, which is not accompanied by a liquefying enzyme. The extent of saccharification depends largely on the degree of liquefaction. The natural state of liquefaction of cereal starches is similar to that of potato starch which has been liquefied at 140°–150°.

Abstract in *Jour. soc. chem. ind.*, 1905, v. 24, p. 508; *Jour. chem. soc.*, 1905, v. 88, part 1, p. 624; *Chem. Centr.*, 1905, Bd. 1, p. 1413; *Bull. assoc. chimistes*, 1904–05, tome 22, p. 1346; 1905–06, tome 23, p. 178.

319. **Ford,** John S., and John M. Guthrie. On the identity of the hydrolytic products of starches of various origins. (Society of Chemical Industry, Journal, London, 1905, v. 24, p. 605–606.) VOA

Nineteen varieties of starches are hydrolyzed, under identical conditions, by malt extract. Results indicate that the hydrolytic products of purified starches are identical, regardless of origin. Note the presence of copper in a sample used in the contradictory work of O'Sullivan.

Abstract in *Chem. Centr.*, 1905, Bd. 2, p. 544; *Bull. assoc. chimistes*, 1906–07, tome 24, p. 402; 1907–08, tome 25, p. 580–581.

320. **Jalowetz,** Ed. Die Isomaltose. (Zeitschrift für angewandte Chemie, Berlin, 1905, Jahrg. 18, p. 171.) VOA

Abstract in *Chem. Centr.*, 1905, Bd. 1, p. 1091.

321. **Roux,** Eugène. Sur la saccharification par le malt des amidons artificiels. (Académie des sciences, Comptes rendus, Paris, 1905, tome 140, p. 1259–1261.) *EO

"Artificial starches," when saccharified by malt extract at various temperatures, show a higher degree of hydrolysis than does

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ordinary starch paste under the same conditions.

Abstract in *Jour. soc. chem. ind.*, 1905, v. 24, p. 630; *Jour. chem. soc.*, 1905, v. 88, part 1, p. 624; *Chem. Centr.*, 1905, Bd. 2, p. 35.

322. **Fernbach,** Auguste, and Jules Wolff. Sur la transformation presque intégrale en maltose des dextrines provenant de la saccharification de l'amidon. (Académie des sciences, Comptes rendus, Paris, 1906, tome 142, p. 1216–1218.) *EO

Using varying degrees of alkalinity they obtain 100.7% and 103.8% maltose, calculated on the original starch. Conclude that all dextrins are capable of complete conversion into maltose.

Abstract in *Jour. soc. chem. ind.*, 1906, v. 25, p. 648; *Jour. chem. soc.*, 1906, v. 90, part 1, p. 484; *Chem. Centr.*, 1906, Bd. 2, p. 229; *Jahresber. Chem.*, 1905–08, Bd. 2, p. 924; *Bull. assoc. chimistes*, 1906–07, tome 24, p. 211.

323. **Maquenne,** Léon. Sur l'amidon et sa saccharification diastasique. (Société chimique de Paris, Bulletin, 1906, July 6, p. i–xv.) PKA

A summary of recent work.

Abstract in *Chem. Centr.*, 1906, Bd. 2, p. 1727.

324. **Maquenne,** Léon, and Eugène Roux. Recherches sur l'amidon et sa saccharification diastasique. (Annales de chimie et de physique, Paris, 1906, série 8, tome 9, p. 179–220.) PAA

A summary of their recent work.

Abstract in *Chem. abst.*, 1907, v. 1, p. 246; *Wag. Jahr.*, 1906, Jahrg. 52, Abt. 2, p. 225.

325. **Rheinfels,** C. Das Maltodextrin γ, ein Zwischenprodukt der diastatischen Stärkehydrolyse. (Auszug.) (Wochenschrift für Brauerei, Berlin, 1906, Jahrg. 23, p. 510–511.) † VTRA

Saccharification was continued until the products no longer gave a red iodine reaction, maltodextrin- γ was then isolated by fractional precipitation with alcohol; it was fermented to the extent of 50% by Frohberg yeast, $\alpha_D = 167^\circ$ and $R = 60(M)$.

Also in *Zeitschrift für Spiritusindustrie*, 1907, Jahrg. 30, p. 371; *Jour. soc. chem. ind.*, 1906, v. 25, p. 998; 1907, v. 26, p. 1023; *Bull. assoc. chimistes*, 1907–08, tome 25, p. 298.

326. **Fernbach,** Auguste, and Jules Wolff. Sur la saccharification de l'amidon soluble par l'extrait d'orge. (Académie des sciences, Comptes rendus, Paris, 1907, tome 145, p. 80–82.) *EO

Barley extract preserved for 25 days under toluene and fresh barley extract are allowed to act on soluble starch at 30° for 332 hours. The first effects the formation of 103.5% maltose and the second 94.9%, calculated on the original starch.

Condensed in *Bull. assoc. chimistes*, 1907–08, tome 25, p. 298–299, 700–701.

Abstract in *Jour. soc. chem. ind.*, 1907, v. 26, p. 833; *Chem. abst.*, 1907, v. 1, p. 2419; *Chem. Centr.*, 1907, Bd. 2, p. 614.

327. **Hansen-Bonn.** The feeding of saccharified starch. (Abstract.) (Chemical abstracts, Easton, 1907, v. 1, p. 1306.) PKA

Converted starch is used for feeding calves. Discusses method and cost of saccharification.

328. **Klein.** Fütterungsversuch mit durch Diastasolin verzuckerter Stärke bei Ferkeln, ausgeführt am Milchwirtschaftlichen Institut zu Proskau. (Milch-Zeitung, Leipzig, 1907, Jahrg. 36, p. 461.) † VPQA

Abstract in *Chem. Centr.*, 1907, Bd. 2, p. 1651.

329. **Matthews,** Charles G., and R. A. Auty. Influence of mashing temperature upon the composition of wort. (Institutes of Brewing, Journal, London, 1907, v. 13, p. 685–703.) VTRA

Have made malt conversions at different temperatures, analyzing the products before and after fermentation of the boiled and unboiled worts. Conclude that starch in malt exists in a state very different from that of the original barley starch. There is evidence of the formation of dextrose in low temperature conversions.

Abstract in *Jour. soc. chem. ind.*, 1908, v. 27, p. 134.

330. **Wolff,** Jules, and Auguste Fernbach. Sur l'inégalité de résistance de l'amidon naturel et de l'amylose artificielle vis-à-vis de l'extrait d'orge. (Académie des sciences, Comptes rendus, Paris, 1907, tome 144, p. 645–646.) *EO

The specific enzyme which saccharifies amylopectin is not present in barley extract, although amylose, both pure and natural, is converted practically completely into maltose by the action of barley extract. Maltose is the only sugar formed.

Abstract in *Jour. chem. soc.*, 1907, v. 92, part 1, p. 482; *Jour. soc. chem. ind.*, 1907, v. 26, p. 426; *Chem. abst.*, 1907, v. 1, p. 1480; *Chem. Centr.*, 1907, Bd. 1, p. 1339; *Bull. assoc. chimistes*, 1906–07, tome 24, p. 1597.

331. **Wolff,** Jules. Action comparée des extraits d'orge et de malt sur les dextrines les plus résistantes. (Académie des sciences, Comptes rendus, Paris, 1907, tome 144, p. 1368–1370.) *EO

At 45° barley extract acted only feebly, and after 48 hours ceased to act altogether, whilst malt extract gradually transformed the dextrins into maltose.

Abstract in *Jour. soc. chem. ind.*, 1907, v. 26, p. 832; *Chem. abst.*, 1907, v. 1, p. 2313; *Chem. Centr.*, 1907, Bd. 2, p. 416; *Bull. assoc. chimistes*, 1907–08, tome 25, p. 812–813.

Starches and Dextrins, continued.

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332. —— Expériences sur la nature de l'amidon, et des réactions selon les conditions de milieu. (Revue générale des sciences pures et appliquées, Paris, 1907, tome 18, p. 459–464.) **OA**

Is a comprehensive review of the recent work on chemistry of starch and its behavior with saccharifying enzymes under different conditions.

Condensed in *Bull. assoc. chimistes*, 1907–08, tome 25, p. 701–703.

333. Baker, Julian L., and F. Day. Preparation of pure maltose. (Analyst, London, 1908, v. 33, p. 393.) **PKA**

Utilizes the fact that soluble starch is acted upon by the precipitated diastase of barley to give only maltose and α-amylodextrin.

Also in *Jour. soc. chem. ind.*, 1908, v. 27, p. 1125.

334. Heinzelmann, G. Einige Gärungsversuche mit durch Gluten, anstatt durch Diastase verzuckerten Getreidemaischen. (Zeitschrift für Spiritusindustrie, Berlin, 1908, Jahrg. 31, p. 12.) **†† VTZA**

States that, as the mashes were carried out at 65° (*entry 3395*), the results cannot be taken as indicative of the amount of diastase present; the starches, from which low yields were obtained, are gelatinized considerably above 65°.

Abstract in *Jour. soc. chem. ind.*, 1908, v. 27, p. 134.

335. Mohr, Otto. Die Chemie der Dextrine während der letzten 25 Jahre. (Wochenschrift für Brauerei, Berlin, 1908, Jahrg. 25, p. 628–637.) **† VTRA**

A review, in which the researches relating to the brewery and distillery are particularly emphasized.

336. Philoche, C. Recherches physico-chimiques sur l'amylase et la maltase. (Journal de chimie physique, Genève et Paris, 1908, tome 6, p. 212–293.) **PKA**

Investigates rate of hydrolysis of starch by the amylase from taka-diastase, from Merck's "absolute diastase" of malt, and from pancreatic juice.

Abstract in *Jour. soc. chem. ind.*, 1908, v. 27, p. 761; *Jour. chem. soc.*, 1908, v. 94, part 2, p. 470; *Chem. abst.*, 1908, v. 2, p. 2753; *Chem. Zentr.*, 1908, Bd. 1, p. 2050–2052.

337. —— Recherches physico-chimiques sur l'amylase et la maltase. (Journal de chimie physique, Genève et Paris, 1908, tome 6, p. 355–422.) **PKA**

The velocity of hydrolysis of starch by malt amylase and taka-diastase increases with increase in the concentration of the starch within the limits 0.5% to 2.5% and is not proportional to the quantity of amylase. Concludes with a discussion on the general theory of enzymes.

Abstract in *Jour. chem. soc.*, 1908, v. 94, part 1, p. 712; *Jour. soc. chem. ind.*, 1908, v. 27, p. 761; *Chem. Zentr.*, 1908, Bd. 2, p. 622.

338. Sevenster, S. S. Verzuckerte Stärke als Aufzuchtsfutter für Schweine. (Milch-Zeitung, Leipzig, 1908, Jahrg. 37, p. 88.) **† VPQA**

The starch is saccharified with diastasolin.

Abstract in *Chem. Centr.*, 1908, Bd. 1, p. 2318.

339. Gatin-Gruzewska, Z., and M. Bierry. Action du suc pancréatique sur le glycogène, l'amidon et des composants. (Académie des sciences, Comptes rendus, Paris, 1909, tome 149, p. 359–361.) *** EO**

The saccharogenic action of normal pancreatic juice is more rapid on starch than on glycogen and amylopectin. Activity is increased by neutralizing the alkalinity of the pancreatic juice.

Abstract in *Chem. abst.*, 1910, v. 4, p. 220; *Chem. Zentr.*, 1909, Bd. 2, p. 999.

340. Huerre, R. Sur la maltase de maïs. (Académie des sciences, Comptes rendus, Paris, 1909, tome 148, p. 300–302.) *** EO**

The maltases of white and yellow maize show optimum temperatures of 40° and 60° respectively. An infusion of white maize acting upon starch paste at 15° produces only dextrose.

Abstract in *Jour. soc. chem. ind.*, 1909, v. 28, p. 254; *Jour. chem. soc.*, 1909, v. 96, part 2, p. 258; *Chem. abst.*, 1909, v. 3, p. 1281; *Chem. Zentr.*, 1909, Bd. 1, p. 1024.

341. Alexander, Jerome. Some colloid-chemical aspects of digestion, with ultramicroscopic observations. (American Chemical Society, Journal, Easton, 1910, v. 32, p. 680–687.) **PKA**

The action of amylase on potato starch grains has been observed under the microscope. Believes action of the enzyme is due to its specific surface action and the motion of its particles.

342. Reichert, Edward Tyson. A reversion of the starch-dextrin reaction. (University of Pennsylvania. Medical bulletin, Philadelphia, 1910–11, v. 23, p. 57–74.)

Available in Library of the Academy of Medicine.

Describes experiments which indicate that the enzymic formation of dextrin from starch may undergo reversion.

Abstract in *Chem. abst.*, 1911, v. 5, p. 712.

343. Riehl, M. Ueber Kohlehydratverdauung und Diastasepräparate. (Münchener medizinische Wochenschrift, München, 1910, Jahrg. 57, p. 1537.)

Starches and Dextrins, continued.

Enzymic Hydrolysis, continued.

Available in Library of the Academy of Medicine.

Studies action of taka-diastase and diamalt extract on raw and gelatinized starch.

Abstract in *Chem. abst.*, 1910, v. 4, p. 2656.

344. **Laer,** Henri van. Nouvelles recherches sur la vitesse de saccharification de l'amidon. 2. (Académie royale de Belgique, Bulletin, Classe des sciences, Bruxelles, 1910, p. 707–718.) * EM

That the rate of hydrolysis follows a logarithmic law has been respectively denied and affirmed by Brown and Glendinning and by Victor Henri; author shows the disagreement is not due to differences in the temperature, the enzyme preparations or the limits of hydrolysis.

Also in *Société chimique de Belgique, Bulletin,* Gand, 1911, année 25, p. 393–401.

Abstract in *Jour. soc. chem. ind.*, 1911, v. 30, p. 1465; *Jour. chem. soc.*, 1911, v. 100, part 2, p. 28; *Chem. Zentr.*, 1911, Bd. 1, p. 132.

345. **Wohl,** A., and E. Glimm. Zur Kenntnis der Amylase (Diastase). (Biochemische Zeitschrift, Berlin, 1910, Bd. 27, p. 349–375.) PPB

Show that the addition of 10% dextrose or 15% maltose to a mixture of amylase and soluble starch completely inhibits diastatic action, although sucrose and fructose display no inhibiting action; also, by removing maltose from saccharification mixtures finds that it inhibits saccharification of dextrins. Maltose exhibits a marked protective action against heat destruction of amylase, while the protective action of starch is comparatively slight. Discuss the colloidal nature of amylase.

Abstract in *Jour. soc. chem. ind.*, 1910, v. 29, p. 1124; *Chem. abst.*, 1911, v. 5, p. 314; *Jour. chem. soc.*, 1910, v. 98, part 1, p. 799; *Chem. Zentr.*, 1910, Bd. 2, p. 1309; *Bull. assoc. chimistes*, 1910–11, tome 28, p. 429, 573; *Bull. soc. chim. Paris*, 1911, série 4, tome 10, p. 1128.

346. **Hill,** A. V. A new form of differential micro-calorimeter, for the estimation of heat production in physiological, bacteriological, or ferment actions. (Journal of physiology, Cambridge, 1911–12, v. 43, p. 261–285.) QCA

Notes that about 0.5 calories are liberated when 1 gram of starch is hydrolyzed by saliva.

347. **Ling,** Arthur R. Malt extract returns, with some remarks on the specific rotatory power of wheat starch conversions and brewery worts. (Institutes of Brewing, Journal, London, 1911, v. 17, p. 570–586.) VTRA

Discussion, p. 586–595.

A suspension of wheat starch is treated with various malt extracts at 55°–65°. The results are not as uniform as when starch paste is used.

Abstract in *Jour. soc. chem. ind.*, 1911, v. 30, p. 1328; *Chem. abst.*, 1912, v. 6, p. 912.

348. **Nagao,** Y. Vergleichende Studien über die Einwirkung von Pankreasdiastase auf Hafer- und Weizenstärke. (Zeitschrift für experimentelle Pathologie und Therapie, Berlin, 1911, Bd. 9, p. 227–237.)

Available in Library of the Academy of Medicine.

Wheat and rye starches are hydrolyzed at equal rates by pancreatic amylase. Oat and barley starches are digested at about the same rate, and much more rapidly than wheat and rye. — *Chem. abst.*

Abstract in *Chem. Zentr.*, 1911, Bd. 2, p. 1216.

349. **Rohonyi,** Hugo. Enzymewirkung und elektrolytische Dissoziation. (Biochemische Zeitschrift, Berlin, 1911, Bd. 34, p. 176–191.) PPB

Finds no appreciable differences in the conductivity of active and inactivated Merck's diastase. The increase in conductivity during the course of starch hydrolysis is shown to be due to liberation of adsorbed salts. No pH variations were noted.

Abstract in *Jour. chem. soc.*, 1911, v. 100, part 1, p. 758; *Bull. soc. chim. Paris*, 1912, série 4, tome 12, p. 572.

350. **Laer,** Henri van. Nouvelles recherches sur la vitesse de saccharification de l'amidon. 3. (Académie royale de Belgique, Bulletin, Classe des sciences, Bruxelles, 1911, p. 84–109.) * EM

Results are tabulated which show that conversion follows the logarithmic law of a unimolecular reaction. Secondary reactions which mask the principal phenomena are, heterogeneity of the starch paste, weakening of the amylase by heat, action of chemical agents, and the coagulations which take place during the course of the reaction.

Abstract in *Jour. chem. soc.*, 1911, v. 100, part 2, p. 478; *Chem. abst.*, 1911, v. 5, p. 2443; *Chem. Zentr.*, 1911, Bd. 1, p. 1687; *Bull. assoc. chimistes*, 1911–12, tome 29, p. 99.

351. —— Nouvelles recherches sur la vitesse de saccharification de l'amidon. 4. (Académie royale de Belgique, Bulletin, Classe des sciences, Bruxelles, 1911, p. 305–320.) * EM

The enzymic saccharification of starch, in a concentration less than 4.5%, follows the law of a unimolecular reaction. Beyond that concentration the rate of hydrolysis increases slightly.

Abstract in *Jour. chem. soc.*, 1911, v. 100, part 2, p. 478; *Chem. Zentr.*, 1911, Bd. 1, p. 1816; *Bull. assoc. chimistes*, 1911–12, tome 29, p. 175.

Starches and Dextrins, continued.

Enzymic Hydrolysis, continued.

352. —— Nouvelles recherches sur la vitesse de la saccharification de l'amidon. 5. (Académie royale de Belgique, Bulletin, Classe des sciences, Bruxelles, 1911, p. 362–370.) *** EM**

When a solution of amylase is placed in contact with a solution of starch, the action begins by the rapid formation of an adsorption combination between the enzyme and its substrate.

Abstract in *Bull. assoc. chimistes,* 1911–12, tome 29, p. 229.

353. —— Nouvelles recherches sur la vitesse de saccharification de l'amidon. 6. (Académie royale de Belgique, Bulletin, Classe des sciences, 1911, p. 795–830.) *** EM**

With regard to Kjeldahl's law of proportionality, investigates retarding effect of the reaction products, limit of the saccharification, relation of velocity coefficient and the concentration of amylase, mechanism of enzymic action, and the exact range of Kjeldahl's law.

Abstract in *Jour. chem. soc.,* 1912, v. 102, part 2, p. 148; *Chem. abst.,* 1912, v. 6, p. 810; *Jour. soc. chem. ind.,* 1912, v. 31, p. 245; *Chem. Zentr.,* 1912, Bd. 1, p. 483; *Bull. assoc. chimistes,* 1911–12, tome 29, p. 710.

354. Evans, C. L. The amyloclastic property of saliva. (Journal of physiology, Cambridge, 1912, v. 44, p. 191–202.) **QCA**

Follows course of hydrolysis. Notes that dextrose is formed in the later stages of hydrolysis and that the optimum temperature for salivary amylase is 46°.

Abstract in *Chem. abst.,* 1912, v. 6, p. 2251; *Chem. Zentr.,* 1912, Bd. 2, p. 729.

355. Heyl, Rutger C:son. Über Malzdiastase und die Einwirkung von Kaliumphosphaten auf dieselbe. (Journal für praktische Chemie, Leipzig, 1912, N. F., Bd. 86, p. 433–457.) **PKA**

The rate of hydrolysis follows the logarithmic law in a way which indicates that only a part of the starch will be converted. Partial removal of proteins lessens the acceleration and increases the inhibition, respectively, of mono- and di-potassium phosphates.

Abstract in *Chem. abst.,* 1913, v. 7, p. 2228; *Jour. soc. chem. ind.,* 1912, v. 31, p. 1090; *Chem. Zentr.,* 1912, Bd. 2, p. 2115; *Bull. soc. chim. Paris,* 1913, série 4, tome 14, p. 323.

356. Riemer, Karl. Kashiwagidiastase. (Arbeiten aus dem Pharmazeutischen Institut der Universität Berlin, 1912, Bd. 9, p. 206–207.)

Available in the Academy of Medicine.

The action of 1 part Kashiwagi diastase on 500 parts potato starch caused the saccharification of 64% of the latter. — *Chem. abst.*

357. Laer, Henri van. Sur l'état de la diastase saccharifiante du malt après son action. (Société chimique de Belgique, Bulletin, Gand, 1912, année 26, p. 223–226.) **PKA**

Found that previous action had not decreased the saccharogenic activity of malt amylase. The phenomenon is therefore truly catalytic.

Abstract in *Chem. abst.,* 1913, v. 7, p. 205; *Chem. Zentr.,* 1912, Bd. 2, p. 1034; *Bull. assoc. chimistes,* 1912–13, tome 3, p. 139–140.

358. —— Sur une action spéciale exercée par la température sur la diastase saccharifiante du malt. (Société chimique de Belgique, Bulletin, Bruxelles, 1912, année 26, p. 18–28.) **PKA**

The saccharifications, effected by an extract of malt, sufficiently weakened under the action of heat, are characterised by a diminishing velocity coefficient. The presence of maltose, to a certain extent, protects the amylase against destruction by heat.

Abstract in *Jour. soc. chem. ind.,* 1912, v. 31, p. 197; *Jour. chem. soc.,* 1912, v. 102, part 2, p. 244; *Chem. abst.,* 1912, v. 6, p. 665, 1807; *Chem. Zentr.,* 1912, Bd. 1, p. 930.

359. Biltz, Wilhelm. Zur Kenntnis des diastatischen Stärke-Abbaues. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1913, Jahrg. 46, p. 1532–1536.) **PKA**

Potato starch paste is treated with malt extract, portions of the conversion products withdrawn at intervals, the dextrins separated by precipitation with alcohol and their molecular weights determined by viscosity methods. Approximate molecular weights are 10,000, 7,000 and 3,700 for amylo-, erythro- and achroodextrins, respectively; the rate of saccharification of each diminishes in the order named.

Abstract in *Chem. abst.,* 1913, v. 7, p. 2702; *Jour. chem. soc.,* 1913, v. 104, part 1, p. 707; *Jour. soc. chem. ind.,* 1913, v. 32, p. 619; *Chem. Zentr.,* 1913, Bd. 2, p. 31; *Bull. soc. chim. Paris,* 1913, série 4, tome 14, p. 1100.

360. Hamburg, Max. Starch and its decomposition products. (Society of Dyers and Colourists, Journal, Bradford, 1913, v. 29, p. 151–156.) **† VLG**

361. Wierzchowski, Zenon. Studien über die Einwirkung von Maltase auf Stärke. (Académie des sciences de Cracovie, Bulletin internationale, 1913, A, p. 522–528.) *** QPA**

Amylase is removed from maize by extraction with water; the insoluble maltase, which remains, completely converts soluble starch to glucose without the formation of intermediate dextrins.

Also in *Biochemische Zeitschrift,* Berlin, 1913, Bd. 56, p. 209–219, *PPB.*

Abstract in *Jour. soc. chem. ind.,* 1913, v. 32, p. 1026; *Chem. abst.,* 1914, v. 8, p. 1028; *Chem. Zentr.,* 1913, Bd. 2, p. 2142; *Bull. assoc. chimistes,* 1913–14, tome 30, p. 529; *Bull. soc. chim. Paris,* 1915, série 4, tome 18, p. 637.

Starches and Dextrins, continued.

Enzymic Hydrolysis, continued.

362. **Baker,** Julian L., and H. F. E. Hulton. Action of diastase on starch granules. 1. (Chemical Society of London, Journal, 1914, v. 105, p. 1529–1536.) **PKA**

A dextrin, $\alpha_D = 177°$ and $R = 11\text{–}20(M)$, constitutes about 1/5 of the products resulting from action of precipitated diastase on barley starch; also a dextrin is formed having the same molecular weight as maltose but lower cupric reducing power.

Abstract in *Jour. soc. chem. ind.*, 1914, v. 33, p. 760; *Chem. Zentr.*, 1914, Bd. 2, p. 617; *Bull. soc. chim. Paris,* 1915, série 4, tome 18, p. 29.

363. **Davis,** William A. Some notes on the chemistry of starch and its transformation. (Society of Dyers and Colourists, Journal, Bradford, 1914, v. 30, p. 249–255.) **† VLG**

Discusses methods for determining starch; gives curves and tables showing nature of conversion by taka-diastase at 38° and 55° and velocity coefficients of conversion at the former temperature.

Abstract in *Jour. soc. chem. ind.*, 1914, v. 33, p. 800.

364. **Gatin-Gruzewska,** Z. Action de quelques diastases sur les dextrines. (Académie des sciences, Comptes rendus, Paris, 1914, tome 159, p. 343–345.) *** EO**

Action of taka-diastase, and pancreatic, vegetable and snail amylases on the dextrins of starch and glycogen indicates a difference in the constitution of the two substances.

Abstract in *Jour. soc. chem. ind.*, 1914, v. 33, p. 880; *Chem. Zentr.*, 1915, Bd. 1, p. 1057; *Bull. soc. chim. Paris,* 1915, série 4, tome 17, p. 151.

365. **Macquaire,** P. Essais de la diastase amylolytique du pancréas. (Académie des sciences, Comptes rendus, Paris, 1914, tome 158, p. 1289–1291.) *** EO**

Finds a relative decrease in the amount of sugar formed when the amounts of starch and amylase are increased.

Abstract in *Chem. abst.*, 1914, v. 8, p. 3310; *Chem. Zentr.*, 1914, Bd. 2, p. 150.

366. **Collens,** A. E. Alcohol from cassava. (Trinidad and Tobago. — Agricultural Department, Bulletin, 1915, v. 14, p. 56–57.) **VPW**

In the two experiments, saccharified with malt and taka diastase, obtaining respectively 75.6 and 81.5 gallons of 94% alcohol per ton of dry material.

Abstract in *Chem. abst.*, 1915, v. 9, p. 2284; *Jour. soc. chem. ind.*, 1915, v. 34, p. 629.

367. **Maxwell,** L. A. I. The relation of salivary to gastric digestion. (Biochemical journal, London, 1915, v. 9, p. 323–329.)

Available in the Library of the Academy of Medicine.

Colloidal starch adsorbs pepsin, thereby hindering its activity. One of the important functions of the ptyalin of the saliva is to hydrolyze the starch to non-colloidal forms. — *Chem. abst.*

Abstract in *Chem. Zentr.*, 1916, Bd. 2, p. 232.

368. **Serono,** Cesare. Sull'aumento di temperatura che si verifica per l'azione dell' amilasi pancreatica. (Rassegna di clinica, terapia e scienze affini, Roma, 1915, anno 14, p. 325–328.)

Available in the Library of the Surgeon General's Office.

It was found when 50 cc. of 2% potato starch paste are treated with 4 cc. of pancreatic glycerol extract in a Dewar flask that there is an invariably positive change in temperature of 0.05° from which it is concluded that heat is evolved in this reaction. — *Chem. abst.*

A second abstract in *Chem. abst.*, 1916, v. 10, p. 1045.

369. **Biedermann,** W. Fermentstudien. 1. Das Speichelferment. (Fermentforschung, Leipzig, 1916, Bd. 1, p. 385–436.) **PPH**

Experiments indicating the time necessary for decomposition of starch to dextrin by ptyalin is inversely proportional to the quantity of the enzyme and that the hydrolysis proceeds in two stages, starch to dextrin and dextrin to maltose. Also shows that dilute boiled starch solution can be hydrolyzed with comparative rapidity by saliva ash, and that this effect is due to an enzyme liberated from the starch under the conditions of the experiment.

Abstract in *Chem. abst.*, 1919, v. 13, p. 452.

370. **Blake,** J. C. Digestibility of bread. 1. Salivary digestion in vitro. (Preliminary paper.) (American Chemical Society, Journal, Easton, 1916, v. 38, p. 1245–1260.) **PKA**

In starch and its degradation products, author recognizes and identifies amylocellulose, amylopectin, rose amylose, achroodextrin, erythrodextrin, amylodextrin, and red and blue amylose. The specific rotation, the alcohol precipitability, the color of the iodide and the transition temperature of the iodide are cited as proof of their individuality. Gives experiments showing the bearing of these substances on the digestion of bread.

Abstract in *Chem. abst.*, 1916, v. 10, p. 1883–1884; *Chem. Zentr.*, 1917, Bd. 1, p. 431.

371. **Davis,** William Alfred, and Arthur John Daish. Distribution of maltase in plants. (Biochemical journal, London, 1916, v. 10, p. 31–75.)

Available in Library of the Academy of Medicine.

Starches and Dextrins, continued.

Enzymic Hydrolysis, continued.

Notes that maltase does not act upon starch and that there is sufficient maltase in air-dried, germinated barley to convert all the maltose from the starch into glucose.

Abstract in *Chem. abst.*, 1916, v. 10, p. 1877; *Chem. Zentr.*, 1916, Bd. 2, p. 1168–1170.

372. **Ehrich,** E. Mitteilung über einige Beobachtungen bei der Verzuckerung von verkleisterter Malzstärke. (Allgemeine Brauer- und Hopfen-Zeitung, Nürnberg, 1916, Jahrg. 56, p. 527–528.)

Available in Library of the Department of Agriculture.

Finds that raw and gelatinized potato starch is more readily saccharified than barley starch and the latter more easily than gelatinized malt starch. — *Chem. abst.*

373. **Sherman,** Henry C., and P. W. Punnett. Products of the action of certain amylases upon soluble starch, with special reference to the formation of glucose. (American Chemical Society, Journal, Easton, 1916, v. 38, p. 1877–1885.) **PKA**

Dextrose is identified by a determination of reducing and rotatory powers and by preparing the osazone from an alcoholic extract of the conversion mixture. Conversions with amylases of malt, pancreatin and A. oryzae show varying amounts of dextrose formed. That both the commercial and highly purified preparations form approximately the same relative proportions of maltose and dextrose is taken as an indication that dextrose is produced without the action of a second enzyme (maltase). Note that 1% of the weight of soluble starch is left as a finely divided, insoluble residue.

Abstract in *Chem. abst.*, 1916, v. 10, p. 2745; *Chem. Zentr.*, 1916, Bd. 2, p. 1124; *Bull. soc. chim. Paris*, 1917, série 4, tome 22, p. 131.

374. **Blake,** J. C. On the digestibility of bread. 2. Salivary digestion of erythrodextrin in vitro. (American Chemical Society, Journal, Easton, 1917, v. 39, p. 315–320.) **PKA**

Finds that the digestion of erythrodextrin by ptyalin is a monomolecular reaction, the optimum temperature for the digestion is 51°, and the retarding influence of maltose is relatively small.

Abstract in *Chem. abst.*, 1917, v. 11, p. 624; *Chem. Zentr.*, 1918, Bd. 1, p. 120.

375. **Pauletig,** Marius. Untersuchungen über die Verdaulichkeit der Stärke verschiedener pflanzlicher Futtermittel durch Malz-, Pankreas- und Speicheldiastase. (Zeitschrift für physiologische Chemie, Hoppe-Seyler's, Strassburg, 1917, Bd. 100, p. 74–92.) **PKA**

Incubates solutions of the various starches with amylases from different sources, and after 2 hours, notes the behavior of the mixture to I and to Fehling solution. The chief conclusion drawn is that amylase hydrolyzes starch from cereals more readily than starch from the leguminosæ. — *Chem. abst.*

Abstract in *Chem. Zentr.*, 1917, Bd. 2, p. 762.

376. **Rohmann,** F. Über die Bildung von Milchzucker aus Stärke durch die "Hervorgelockten" Fermente des Rohrzuckerserums. (Biochemische Zeitschrift, Berlin, 1917, Bd. 84, p. 399–401.) **PPB**

The parenteral injection of sucrose into rabbits gives rise to special ferments in the serum. The extract of the liver of a rabbit thus treated acts on soluble starch, causing degradation and producing, among other products, lactose. — *Chem. abst.*

Abstract in *Bull. soc. chim. France*, 1920, série 4, tome 28, p. 63.

377. **Temminck Groll,** J. Over den invloed van enkele stoffen op zetmeeloplossingen en op de werking van speeksel-amylase. (Nederlandsch tijdschrift voor geneeskunde, Haarlem, 1917, jaarg. 61, 2B, p. 1029–1041.)

Available in Library of the Academy of Medicine.

In certain cases, the reversible decomposition of starch is noted. Discusses influence of surface tension on course of starch hydrolysis.

Abstract in *Chem. abst.*, 1918, v. 12, p. 485.

378. **Thevenot,** G. Saccharification of raw cereal mashes. (Brewers journal, London, 1917, v. 53, p. 250–253.) **VTRA**

Abstract in *Jour. soc. chem. ind.*, 1917, v. 36, p. 900.

379. **Garard,** Ira D., and Henry C. Sherman. A study of the glucosazone reaction. (American Chemical Society, Journal, Easton, 1918, v. 40, p. 955–969.) **PKA**

Work includes a determination of effect of starch and dextrin on the precipitation of glucosazone. The method developed was applied to the detection of glucose among the products of hydrolysis of starch by takadiastase, the result being positive.

Abstract in *Chem. Zentr.*, 1918, Bd. 2, p. 709.

380. **Coombs,** F. E. Determination of maltose conversions. (Chemical and metallurgical engineering, New York, 1919, v. 21, p. 398–399.) **VOA**

Gives formula for calculating maltose-dextrin ratio based on determinations of specific gravity and reducing power. The formula may be applied to acid starch conversions as well as malt conversions.

Abstract in *Chem. abst.*, 1920, v. 14, p. 3334; *Chem. Zentr.*, 1920, Bd. 2, p. 194.

Starches and Dextrins, continued.

Enzymic Hydrolysis, continued.

381. **McGuigan,** Hugh. The action of ptyalin. (Journal of biological chemistry, Baltimore, 1919, v. 39, p. 273–284.) **PPB**

Concludes that in dilute solutions ptyalin acts on starch at a rate directly proportional to the amount of ptyalin present. The establishing of an equilibrium point is not due to the retarding influence of the maltose and dextrose formed.

Abstract in *Chem. abst.,* 1919, v. 13, p. 3197; *Chimie et industrie,* 1920, v. 4, p. 342.

382. **Samec,** Max. Studien über Pflanzenkolloide. 7. Zur Kenntnis der Diastasewirkung. (Kolloidchemische Beihefte, Dresden und Leipzig, 1919, Bd. 10, p. 289–304.) **PKA**

A solution of potato starch was subjected to the action of amylase at 50° and samples withdrawn at various intervals; they were tested for molecular weight by the osmometer method, for freezing point depression, rotatory power, reducing power, coloration with I, viscosity, conductivity, electric migration and H ion concentration. Results are shown in curves. Outlines the stepwise degradation of starch through the amylo-, erythro-, and achroo-dextrin stages.

Abstract in *Chem. abst.,* 1920, v. 14, p. 2003; *Jour. chem. soc.,* 1919, v. 116, part 1, p. 472; *Chem. Zentr.,* 1919, Bd. 3, p. 343.

383. **Sherman,** Henry C., and others. Action of enzymes upon starches of different origin. By H. C. Sherman, Florence Walker and Mary L. Caldwell. (American Chemical Society, Journal, Easton, 1919, v. 41, p. 1123–1129.) **PKA**

Study rate of hydrolysis of 4 different starches by enzyme containing materials and by purified enzyme preparations. When similarly purified by washing with dilute alkali, wheat, maize and rice starches show the same rate of enzymic hydrolysis. Potato starch shows, in general, a rate of hydrolysis equal to or slightly greater than that of the cereal starches.

Abstract in *Chem. abst.,* 1919, v. 13, p. 2297; *Chem. Zentr.,* 1919, Bd. 3, p. 829; *Chimie et industrie,* 1920, v. 3, p. 616; *Bull. soc. chim. France,* 1920, série 4, tome 28, p. 27.

384. **Dale,** J. K. Manufacture and uses of malt sirup. (Sugar, New York, 1920, v. 22, p. 331–332.) **VTL**

Abstract in *Chem. abst.,* 1920, v. 14, p. 3334.

385. **Falch,** M. Über die Darstellung von Maltose. (Zeitschrift für das gesammte Brauwesen, München und Berlin, 1920, Jahrg. 43, p. 281–283, 289–291, 297–299, 306–309.) **† VTRA**

Describes attempts to prepare readily crystallizible maltose syrups by precipitation of dextrin with alcohol and barium hydroxide. Recommends a method in which the mash is treated for 3 days with malt extract and very dilute HF, neutralized with calcium carbonate, filtered, the filtrate evaporated in vacuo and seeded with a particle of maltose.

Abstract in *Chem. abst.,* 1921, v. 15, p. 2209; *Jour. chem. soc.,* 1921, v. 120, part 1, p. 161; *Chem. Zentr.,* 1920, Bd. 3, p. 880.

386. **Herzfeld,** E., and R. Klinger. Zur Chemie der Polysaccharide. (Biochemische Zeitschrift, Berlin, 1920, Bd. 107, p. 268–294.) **PPB**

Prepares pure starch by a series of alcohol precipitations from an alkaline solution, with subsequent neutralization and a final precipitation with alcohol. Dextrinization by diastase and iodine colorations are explained on the basis of variations in the degree of dispersion.

Abstract in *Chem. abst.,* 1921, v. 15, p. 99; *Jour. soc. chem. ind.,* 1921, v. 40, p. 784A; *Chem. Zentr.,* 1920, Bd. 3, p. 582; *Bull. soc. chim. France,* 1922, série 4, tome 32, p. 357.

387. —— Berichtigung und Ergänzung zu unserer Arbeit: "Zur Chemie der Polysaccharide." (Biochemische Zeitschrift, Berlin, 1920, Bd. 112, p. 55–60.) **PPB**

Phenylhydrazine is used to show the presence of maltose in diastase-starch digestion. Show that the unsaccharified residue, obtained after enzyme hydrolysis, is a more highly dispersed form of starch or dextrin and may be further saccharified if removed and treated again with diastase and also that treatment with alkali and alcohol will change the condition of its surface so as to bring about the reappearance of the iodine reaction.

Abstract in *Chem. abst.,* 1921, v. 15, p. 1141; *Jour. chem. soc.,* 1921, v. 120, part 1, p. 97; *Chem. Zentr.,* 1921, Bd. 1, p. 351.

388. **O'Sullivan,** James. Influence of the temperature, concentration, duration of the mash and slackness of malt on the starch products of the extract of malt. (Society of Chemical Industry, Journal, London, 1920, v. 39, p. 22–27 T.)

Available in Library of the Chemists' Club.

Abstract in *Chem. Zentr.,* 1920, Bd. 2, p. 731; *Chem. abst.,* 1922, v. 16, p. 1829; *Chimie et industrie,* 1921, v. 5, p. 456.

389. **Laer,** Henri van. Recherches sur le mode d'action des diastases hydrolysantes. (Société chimique de Belgique, Bulletin, Bruxelles, 1920, tome 29, p. 214–227.) **PKA**

The nature of amylase is discussed at length, although the experimental work deals with invertase.

390. **Baker,** Julian L., and H. F. E. Hultions. Show that the unsaccharified resi-

Starches and Dextrins, continued.

Enzymic Hydrolysis, continued.

(Chemical Society of London, Journal, 1921, v. 119, part 1, p. 805–809.) PKA

Find that ungerminated rye amylase, acting on potato starch paste at 50°, readily liquefies the paste and yields maltose and α-amylodextrin ($R = 1.5$; $\alpha_D = 184^\circ$). The amylase of germinated barley, under the same conditions, yields crystalline maltose and a non-hygroscopic, unfermentable reducing dextrin ($R = 10.8$; $\alpha_D = 182^\circ$).

Abstract in *Chem. Zentr.*, 1921, Bd. 3, p. 734; *Chem. abst.*, 1923, v. 17, p. 1254; *Bull. soc. chim. France*, 1921, série 4, tome 30, p. 1233.

391. **Euler,** Hans von, and Olof Svanberg. Über die Charakterisierung von Amylaselösungen. (Zeitschrift für physiologische Chemie, Hoppe-Seyler's, Berlin und Leipzig, 1921, Bd. 112, p. 193–230; Bd. 115, p. 179.) PKA

Give a comprehensive review of earlier literature relating to velocity of enzymic starch hydrolysis. Using dialyzed malt extract, determinations were carried out, in which the amount of enzyme, amount of substrate, the acidity and the activating salts were all varied. Introduce a new and more absolute measure for activity of amylase preparations. Calculate results to Lintner units and to units on the "new scale" of Sherman and his co-workers.

Abstract in *Chem. abst.*, 1921, v. 15, p. 4014; *Chem. Zentr.*, 1921, Bd. 3, p. 113; *Bull. soc. chim. France*, 1921, série 4, tome 30, p. 1585.

392. **Fraenkel,** Sigmund, and Gino Meldolesi. Über die Beziehung von Druck, Temperatur und Fermentwirkung. 1. Die Wirkung von Druck auf die Geschwindigkeit der Fermenthydrolysen durch Pepsin, Trypsin und Diastase. (Biochemische Zeitschrift, Berlin, 1921, Bd. 115, p. 85–95.) PPB

Have determined velocity of diastatic hydrolysis at 1, 5, 10 and 15 atmospheres pressure, the greatest acceleration being noted at 5 atmospheres.

Abstract in *Chem. abst.*, 1921, v. 15, p. 1910; *Chem. Zentr.*, 1921, Bd. 1, p. 843; *Bull. soc. chim. France*, 1921, série 4, tome 30, p. 1574.

393. **Maestrini,** Dario. Ricerche sperimentali sulla velocità di reazione degli enzimi vegetali. (Archivio di farmacologia sperimentale e scienze affini, Roma, 1921, v. 32, p. 40–59, 99–112, 126–133.)

Available in Library of the Academy of Medicine.

Determines influence of concentration of enzyme, influence of pH, and influence of amount and concentration of substrate on the activity of malt amylase. Notes that $CaCl_2$ does not inhibit amylolytic activity whereas $CdCl_2$ has a marked inhibitory effect.

Abstract in *Chem. abst.*, 1922, v. 16, p. 1593; *Chem. Zentr.*, 1922, Bd. 3, p. 1008.

394. **Meldolesi,** Gino. L'influenza della pressione sulla velocità di reazione dei fermenti pepsina, tripsina e diastasi. (Policlinico, Roma, 1921, v. 28, p. 390–412.)

Available in Library of the Academy of Medicine.

Suggests that the pressure effect is due to an approximation of the molecules of enzyme and substrate. Each enzyme exhibits an optimum pressure.

395. **Welzmueller,** Ferdinand. Die Abbaufähigkeit der Kuhmilchdiastase gegen verschiedene Stärkearten. (Biochemische Zeitschrift, Berlin, 1921, Bd. 125, p. 179–186.) PPB

Using HCl-treated starches from a large number of sources, finds the optimum activity of milk amylase lies at 37°. The starches do not exhibit the same order of digestibility with milk amylase as with malt or pancreatic amylase.

Abstract in *Chem. abst.*, 1922, v. 16, p. 937; *Chem. Zentr.*, 1922, Bd. 1, p. 830.

396. **Lüers,** H., and W. Wasmund. Über die Wirkungsweise der Amylase. (Fermentforschung, Leipzig, 1922, Bd. 5, p. 169–235.) PPH

The course of degradation of starch by malt amylase has been followed by determining maltose formed. Have investigated influence of concentration of starch, concentration of amylase, temperature of reaction, presence of reaction products, character of starch employed, concentration of H ion, and partial inactivation of amylase by heat; have carried out experiments with a specially purified amylase. The study of reaction velocity confirms proportionality law of Kjeldahl. Favor the view that both starch and its hydrolytic enzyme are individual substances.

Condensed in *Zeitschrift für das gesammte Brauwesen*, 1922, Jahrg. 45, p. 81–85, 127–130, 137–138, 144–146, 147–150, 152–154, 155–157, † *VTRA*.

Abstract in *Chimie et industrie*, 1923, v. 10, p. 148; *Jour. soc. chem. ind.*, 1923, v. 42, p. 112A; *Chem. abst.*, 1922, v. 16, p. 3098; 1923, v. 17, p. 3225; *Chem. Zentr.*, 1922, Bd. 1, p. 697–699.

397. **Windisch,** W. Über das verschiedene Verhalten der verschiedenen Rohfruchtmaterialien bei der diastatischen Lösung und Verzuckerung. (Wochenschrift für Brauerei, Berlin, 1922, Jahrg. 39, p. 13–14.)

Available in Library of the Department of Agriculture.

Discusses variations due to nature of the malt and raw grain employed. Details a mashing process which is based on the dif-

Starches and Dextrins, continued.

Enzymic Hydrolysis, continued.

ference in optimum temperatures of liquefaction and saccharification.

Abstract in *Jour. soc. chem. ind.*, 1924, v. 43, p. 145B; *Chem. Zentr.*, 1922, Bd. 2, p. 708; *Chem. abst.*, 1924, v. 17, p. 2406.

398. **Berry,** A. F. Flaked maize. (Institute of Brewing, Journal, London, 1923, v. 29, p. 219–227.) **VTRA**

Discusses importance of flaking maize in order to expose greater surface to diastatic action.

Abstract in *Jour. soc. chem. ind.*, 1923, v. 42, p. 468A.

399. **Euler,** Hans von, and K. Josephson. Bezeichnung der Aktivität und Affinität von Enzymen. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1923, Jahrg. 56, p. 1749–1758.) **PKA**

Discuss methods for designating activity of the starch saccharifying enzyme. Show that different results are obtained when the soluble starches of Lintner and of Zulkowski are used as substrates. Compare velocity of enzyme hydrolysis of starch and glycogen.

Abstract in *Jour. chem. soc.*, 1923, v. 124, part 1, p. 966; *Chem. Zentr.*, 1923, Bd. 3, p. 1541.

400. **Fabre,** R., and H. Pénau. Recherches sur les ferments amylolytiques. 2. Sur le mode d'action des ferments amylolytiques du Codex. (Société de chimie biologique, Bulletin, Paris, 1923, tome 5, p. 911–917.)

Available in Library of the Academy of Medicine.

Maltose is the only sugar formed during saccharification of starch by the diastase of germinated barley. Action of official pancreatin preparations produces also glucose (about 5% of the total sugar) which can be characterized by Bourquelot's biochemical method. — *Chem. abst.*

401. **Gore,** H. C., and others. Production of sirup from sweet potatoes. By H. C. Gore, H. C. Reese and J. O. Reed. (United States. — Department of Agriculture, Bulletin, Washington, 1923, no. 1158, 33 p.) **VPZ**

The conversion of starch is effected by treatment with malt at 60°. The experimental plant used is fully described and illustrated and a detailed analysis of costs is given.

Abstract in *Jour. soc. chem. ind.*, 1923, v. 42, p. 941A.

402. **Holmberg,** Oskar. Stärkespaltung durch tierische Amylasen. (Arkiv för kemi, mineralogi och geologi, Stockholm, 1923, Bd. 8, no. 33, p. 1–5.) **PWA**

In the hydrolysis of soluble starch (Zulkowski) by glycerol extracts of liver previously extracted with ether and acetone, equilibrium was reached when 75% of the theoretical amount of maltose was formed. If, however, the maltose formed was removed by fermentation with yeast, the enzymic hydrolysis of the starch was complete. After 40 hours dialysis of soluble starch, 40.8% (Zulkowski soluble starch) and 31.2% (Lintner starch) had passed through the dialyzing membrane. — *Chem. abst.*

Abstract in *Jour. chem. soc.*, 1924, v. 126, part 1, p. 691; *Chem. Zentr.*, 1924, Bd. 1, p. 927.

403. **Hoop,** L. de, and M. J. Van Tussenbroek. Über den Einfluss von Dextrinen auf die Krystallisation von Maltose. (Biochemische Zeitschrift, Berlin, 1923, Bd. 135, p. 217–223.) **PPB**

An investigation of factors which prevent crystallization of maltose from enzymic starch conversions. Have determined influence of dextrins, proteins, peptones and amino acids. No conclusive evidence is obtained that dextrin prevents the crystallization.

Abstract in *Chem. Zentr.*, 1923, Bd. 3, p. 662.

404. **Lintner,** Carl J., and Max Kirschner. Zur Kenntnis des beim diastatischen Abbau der Stärke auftretenden Grenzdextrins. (Zeitschrift für angewandte Chemie, Leipzig, 1923, Jahrg. 36, p. 119–122.) **VOA**

Diastatic degradation does not convert potato starch quantitatively to maltose but about 25% of a diastase-resistant dextrin is formed. This substance, termed achroodextrin II, upon benzoylation and acetylation in pyridine solutions, forms the dibenzoate and diacetate, respectively, for each glucose residue. The reported formation of maltodextrin is ascribed to presence of maltase.

Abstract in *Jour. soc. chem. ind.*, 1923, v. 42, p. 322A; *Chem. Zentr.*, 1923, Bd. 1, p. 1017; *Chimie et industrie*, 1924, v. 12, p. 143; *Bull. soc. chim. France*, 1923, série 4, tome 34, p. 2014.

405. **Maquenne,** Léon. Sur l'hydrolyse du maltose par l'extrait de malt. (Académie des sciences, Comptes rendus, Paris, 1923, tome 176, p. 804–806.) ***EO**

Describes experiments which indicate the presence of maltase in malt extract. Discusses bearing of this observation on the hydrolysis of starch by malt extract.

Abstract in *Jour. soc. chem. ind.*, 1923, v. 42, p. 1238A.

406. **Pringsheim,** Hans, and Walter Fuchs. Über ein Komplement der Amylasen. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1923, Jahrg. 56, p. 1762–1768.) **PKA**

Potato starch was digested with amylase to the point of about 75% sugar formation.

Starches and Dextrins, continued.

Enzymic Hydrolysis, continued.

The sugars were separated from the residual dextrin by dialysis and by fermentation; the product was the same in both cases, had an $\alpha_D = 160°$ and did not give a coloration with iodine. This "residual body" was very slowly attacked by malt amylase alone but was hydrolyzed by a mixture of amylase and yeast extract to approximately 100% maltose, as determined by Cu reduction method.

Abstract in *Chem. abst.*, 1924, v. 18, p. 1507; *Jour. chem. soc.*, 1923, v. 124, part 1, p. 965; *Chem. Zentr.*, 1923, Bd. 3, p. 1578; *Chimie et industrie*, 1924, v. 12, p. 49.

407. **Pringsheim**, Hans, and Karl Schmalz. Über den Grenzabbau der Stärke und ein Komplement der Amylasen. (Biochemische Zeitschrift, Berlin, 1923, Bd. 142, p. 108–116.) **PPB**

Determine course of hydrolysis using various enzyme preparations, with and without the presence of a complement. With a yeast suspension as complement, obtain approximately 100% yield of maltose.

Abstract in *Jour. chem. soc.*, 1924, v. 126, part 1, p. 106; *Chem. abst.*, 1924, v. 18, p. 1838; *Chem. Zentr.*, 1924, Bd. 1, p. 491.

408. **Serono,** Cesare, and Alfonso Cruto. Ricerche sugli enzimi amidolitici e glicolitici del pancreas e delle glandole salivari. (Rassegna di clinica, terapia e scienze affine, Roma, 1923, v. 22, p. 139–142.)

Available in Library of the Surgeon General's Office.

A glycerol extract of pancreas, an aqueous extract of dried sterilized pancreas powder, or salivary diastase does not form maltose or dextrose from starch solution, but only isomaltose. The amount of isomaltose formed depends on the concentration of starch. The amylolytic enzyme from pancreas, after separation from lipolytic and proteolytic enzymes, is unstable, but can be stabilized by the addition of plant colloids to the solution. The presence of colloidal material increases the stability to heat of the pancreatic and salivary enzymes.—*Chem. abst.*

Abstract in *Chem. abst.*, 1924, v. 18, p. 2524.

409. —— Azione contemporanea dell' estratto pancreatico e dell' estratto di altre glandole sugli idrati di carbonio. (Rassegna di clinica, terapia e scienze affini, Roma, 1923, v. 22, p. 199–201.)

Available in Library of the Surgeon General's Office.

Glucose, isomaltose and an unidentified sugar were among the products noted in the hydrolysis of starch. Isomaltose was the chief product when starch was treated with the glycerol extract of the mucous membrane of the small intestine and a large amount of pancreas extract.

Abstract in *Chem. abst.*, 1924, v. 18, p. 3210; *Chem. Zentr.*, 1924, Bd. 1, p. 799.

410. **Chodat**, R., and others. Sur la spécificité des amidons. Par R. Chodat, J. W. Ross et M. Philia. (Archives des sciences physiques et naturelles, Genève, 1924, période 5, v. 6, p. 122–126.) **OA**

The action of barley amylase on variously treated starches is followed by means of the I reaction and by determinations of sugars formed.

Abstract in *Chem. Zentr.*, 1924, Bd. 2, p. 2850.

411. **Euler**, Hans von, and Karin Helleberg. Über die Drehung der bei der Stärkespaltung durch Malz-Extrakt auftretenden Maltose. (Zeitschrift für physiologische Chemie, Hoppe-Seyler's, Berlin und Leipzig, 1924, Bd. 139, p. 24–29.) **PKA**

For the maltose resulting from the action of malt extract on a 2% starch solution at pH 5.09 for 10 minutes, the specific rotation was 121°. α_D for α-maltose is 168°, for β-maltose 118°, and for the equilibrium mixture 136°; hence the maltose liberated by the enzyme is predominantly the β-form. —*Chem. abst.*

Abstract in *Chem. Zentr.*, 1924, Bd. 2, p. 2055.

412. **Harada,** Ken. Über die Spaltung der Stärke durch Amylase. 1. (Journal of biochemistry, Tokyo, 1924, v. 3, p. 149–165.)

Available in Library of the Academy of Medicine.

Potato starch is freed from N by washing with water 8 to 10 times and treating with 90% alcohol. Amylopectin is removed by a process of filtration, evaporation under reduced pressure and precipitation with alcohol. Amylose may be removed by stirring the starch with dilute NaOH, precipitating the amylopectin with acetic acid, and washing the precipitate with water until it no longer gives a blue coloration with Lugol solution. The product contains 0.074% P. Details are also given for the preparation of a standard amylase solution and for the determination of maltose resulting from the hydrolysis of amylose or amylopectin.

Abstract in *Chem. abst.*, 1924, v. 18, p. 699.

413. —— Über die Spaltung der Stärke durch Amylase. 2. (Journal of biochemistry, Tokyo, 1924, v. 4, p. 123–137.)

Available in Library of the Academy of Medicine.

Abstract in *Chem. abst.*, 1925, v. 19, p. 1286; *Chem. Zentr.*, 1925, Bd. 1, p. 1613.

414. **Kuhn**, Richard. Verzuckerung der Stärke durch Emulsin. (Zeitschrift für physiologische Chemie, Berlin and Leipzig, 1924, Bd. 135, p. 12–15.) **PKA**

Starches and Dextrins, continued.

Enzymic Hydrolysis, continued.

Preparations of emulsin from both sweet and bitter almonds effect the hydrolysis of soluble potato starch. By treating amylose with a preparation from bitter almonds for 2–3 days obtains reducing power corresponding to 98% yield of disaccharide. The sugar is characterized as maltose by a determination of its rotatory power and the rotatory power of its osazone. Observations are regarded as evidence favoring the partial β-glucosidic nature of starch.

Abstract in *Chem. Zentr.*, 1924, Bd. 2, p. 345.

415. —— Über die Konstitution der Stärke und die verschiedenen Wirkungsweisen der Amylasen. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1924, Jahrg. 57, p. 1965–1968.) **PKA**

Amylases may be classified in 2 groups: α-amylases and β-amylases, which set free the maltose in the α- and β-forms, respectively. The constitution of starch is discussed from the standpoint of these enzyme actions. — *Chem. abst.*

Abstract in *Chem. Zentr.*, 1925, Bd. 1, p. 235–236.

416. Pringsheim, Hans, and ARTHUR BEISER. Über ein Komplement der Amylasen und das Grenzdextrin. 3. (Biochemische Zeitschrift, Berlin, 1924, Bd. 148, p. 336–343.) **PPB**

Saliva completely hydrolyzes starch to maltose in the presence of a yeast complement. The action of saliva is the same whether obtained after a protein or a carbohydrate meal. Study action of saliva, with and without complement, on amylose and amylopectin. Determine molecular weight and specific rotation for the residual dextrin from amylopectin hydrolysis. A relation in the nature of glycogen and amylopectin is indicated by the course of their hydrolysis in presence of a complement. Crystalline maltose is prepared after adhering sugars are removed by pressure. A control experiment shows the complement does not appreciably effect the hydrolysis of maltose.

Abstract in *Chem. abst.*, 1925, v. 19, p. 660; *Chem. Zentr.*, 1924, Bd. 2, p. 1211.

417. Sjöberg, Knut, and ELSA ERIKSSON. Über Amylase. (Zeitschrift für physiologische Chemie, Hoppe-Seyler's, Berlin und Leipzig, 1924, Bd. 139, p. 118–139.) **PKA**

Study hydrolysis of soluble starch, amylose and amylopectin by the amylases of germinated and ungerminated barley. In no case was more than 80% maltose obtained. Determine optimum pH for hydrolysis of amylose and amylopectin. From a determination of the inhibition of amyloclastic and saccharogenic activities by maltose and glucose conclude there is more than one enzyme in malt amylase.

Abstract in *Chem. abst.*, 1924, v. 18, p. 3602; *Chem. Zentr.*, 1924, Bd. 2, p. 2760; *Jour. soc. chem. ind.*, 1924, v. 43, p. 921B.

418. Vermeylen. Saccharification of starch. (Abstract.) (Chemical abstracts, Easton, 1924, v. 18, p. 1584.) **PKA**

The reaction of the medium was the most important of the factors affecting saccharification.

419. Windisch, W. Studien über Stärke. (Wochenschrift für Brauerei, Berlin, 1924, Jahrg. 41, p. 3–5; 1925, Jahrg. 42, p. 181–183, 187–189, 193–195, 199–201.)

Available in Library of the Department of Agriculture.

A discussion of the more recent developments on the nature of starch and the products of hydrolysis. — *Chem. abst.*

420. Hoop, L. de, and J. A. VAN LAER. Untersuchungen über diastatischen Stärkeabbau. (Biochemische Zeitschrift, Berlin, 1925, Bd. 155, p. 235–244.) **PPB**

Starch may be 96% hydrolyzed to maltose by amylase, provided that sufficient coenzyme is present. If this coenzyme is present in too small a quantity the reaction may stop when the mixture consists of 80% maltose and 20% dextrin. The maltose is separated from the dextrin by means of the insolubility of the dextrin in a pyridine-alcohol mixture. — *Chem. abst.*

Abstract in *Chem. Zentr.*, 1925, Bd. 1, p. 1878.

421. Eckhard, M. Untersuchungen über diastatischen Stärkeabbau. (Zeitschrift für Spiritusindustrie, Berlin, 1925, Jahrg. 48, p. 249.) **†† VTZA**

Experiments indicate that at 50–55° optimum conversion of starch to maltose by means of amylase takes place. More than 80% maltose and less than 20% dextrin cannot be obtained. — *Chem. abst.*

422. Euler, Hans von, and KARL MYRBÄCK. Neue Ergebnisse über den enzymatischen Abbau und Aufbau der Kohlehydrate. (Svensk kemisk tidskrift, Stockholm, 1925, årg. 37, p. 173–184.) **PKA**

Abstract in *Chem. Zentr.*, 1925, Bd. 2, p. 1875.

423. Hattori, K. Action of saliva on starch. (Abstract.) (Chemical abstracts, 1925, v. 19, p. 2349.) **PKA**

Also abstracted in *Chem. Zentr.*, 1925, Bd. 2, p. 45.

424. Kuhn, Richard. Der Wirkungsmechanismus der Amylasen; ein Beitrag zum Konfigurationsproblem der Stärke. (Annalen der Chemie, Liebig's, Leipzig und Berlin, 1925, Bd. 443, p. 1–71.) **PKA**

Abstract in *Chem. abst.*, 1925, v. 19, p. 3098–3100; *Chem. Zentr.*, 1925, Bd. 2, p. 403–406.

Starches and Dextrins, continued.

Enzymic Hydrolysis, continued.

425. **Ling,** Arthur R., and Dinshaw R. Nanji. Studies on starch: 3. The nature and the genesis of the stable dextrin and of the maltodextrins. (Chemical Society of London, Journal, 1925, v. 127, p. 636–651.) **PKA**

Abstract in *Chem. abst.*, 1925, v. 19, p. 1698; *Chem. Zentr.*, 1925, Bd. 2, p. 647–649.

426. **Petit,** Paul, and Richard. Influence du mode de dissolution de l'amylase sur la saccharification de l'amidon. (Académie des sciences, Comptes rendus, Paris, 1925, tome 181, p. 575–577.) ***EO**

Abstract in *Chem. abst.*, 1926, v. 20, p. 428.

427. **Pringsheim,** Hans, and Jesaia Leibowitz. Über α- und β-Amylasen. (Beiträge zur Chemie der Stärke, 13.) (Deutsche chemische Gesellschaft, Berichte, Berlin, 1925, Jahrg. 58, p. 1262–1265.) **PKA**

Abstract in *Chem. abst.*, 1925, v. 19, p. 2678; *Chem. Zentr.*, 1925, Bd. 2, p. 1363.

428. **Sjöberg,** Knut. Über das Pringsheimsche Komplement der Amylasen. (Biochemische Zeitschrift, Berlin, 1925, Bd. 159, p. 468–471.) **PPB**

Author is able to confirm the finding of Pringsheim that a complement from yeast aids the action of amylase upon starch, but the hydrolysis is increased only about 10% or 20%, instead of being carried to completion. — *Chem. abst.*

Abstract in *Chem. Zentr.*, 1925, Bd. 2, p. 1364.

429. **Sullivan,** B. Complement of amylase. (Abstract.) (Chemical abstracts, Easton, 1926, v. 20, p. 1997.) **PKA**

Repeating the work of Pringsheim and Fuchs (*entry 406*) finds that when the pH of the medium is adjusted to certain values, the yeast preparation was entirely devoid of "complementary" action.

430. **Syniewski,** Wiktor. Über nichtreduzierendes Grenzdextrin 1. (Annalen der Chemie, Liebig's, Leipzig und Berlin, 1925, Bd. 441, p. 285–297.) **PKA**

Abstract in *Chem. abst.*, 1925, v. 19, p. 1250; *Chem. Zentr.*, 1925, Bd. 1, p. 1486.

431. —— Untersuchungen über Diastase. 3a. Über die Geschwindigkeit der unter Vermittlung von α-Diastase verlaufenden Stärkehydrolyse. (Biochemische Zeitschrift, Berlin, 1925, Bd. 162, p. 236–244.) **PKA**

The expectation that α-diastatic hydrolysis of starch, like the sucrose hydrolysis by sucrase, would follow the mono-molecular course has not proved correct. The process is much more complex, but not yet elucidated. — *Chem. abst.*

432. **Windisch,** W. Untersuchungen über Diastase. (Wochenschrift für Brauerei, Berlin, 1925, Jahrg. 42, p. 136–138.)

Available in the Library of the Department of Agriculture.

433. —— Wirkungsweise der Diastase. (Wochenschrift für Brauerei, Berlin, 1925, Jahrg. 42, p. 148–150, 153–156, 159, 166–167, 171–173.)

Available in Library of the Department of Agriculture.

The nature of amylases, hexosans and the action of polymerization and association are discussed. Experiments relative to optimum pH, and the distinction between various enzymes and hydrolysates are reported. The effect of the enzyme on the starch molecule is postulated. — *Chem. abst.*

MOLECULAR CONSTITUTION

434. **Saussure,** Théodore de. Observations sur la décomposition de l'amidon à la température atmosphérique par l'action de l'air et de l'eau. (Royal Society of London, Philosophical transactions, 1819, v. 109, part 1, p. 29–58.) **OA**

When starch and water are exposed to a temperature of 20–25° C, with or without access of air, there are several substances formed. These substances are (1) a kind of sugar similar to that formed by the action of acid; (2) a kind of gum similar to roasted starch; (3) a substance termed amidin, intermediate between gum and starch; and (4) a substance insoluble in boiling water and acids and giving a purple I coloration.

Condensed in *Annales de chimie*, 1819, série 2, tome 11, p. 379–408, *PAA; Annalen der Physik*, Gilbert's, Leipzig, 1820, Bd. 64, p. 113–140, *PAA.*

Abstract in *Philosophical magazine*, 1819, v. 53, p. 56.

435. **Prout,** William. On the ultimate composition of simple alimentary substances; with some preliminary remarks on the analysis of organized bodies in general. (Royal Society of London, Philosophical transactions, 1827, v. 117, p. 355–388.) ***EC**

Includes determinations of elementary composition of wheat and arrowroot starches.

Condensed in *Annales de chimie et de physique*, série 2, tome 36, p. 366–378, *PAA; Annalen der Physik und Chemie*, Poggendorff's, 1828, Bd. 12, p. 263–274, *PAA.*

436. **Biot.** Sur la constitution moléculaire de la fécule au moment de sa liquéfaction. (L'Institut, Paris, 1835, année 3, p. 13–14.)

Starches and Dextrins, continued.

Molecular Constitution, continued.

Available in the Engineering Societies Library.

437. **Dulong,** and others. Über die Stärke. (Annalen der Pharmacie, Liebig's, Heidelberg, 1835, Bd. 16, p. 216–224.) **PKA**

The previous works of Payen, Persoz, Couverchel, Guerin-Varry and Lassaigne are coördinated.

Also printed in *Jour. prak. Chem.,* 1834, Bd. 1, p. 382–396.

438. **Dumas.** Zusammensetzung einiger organischer Substanzen. (Journal für praktische Chemie, Leipzig, 1835. Bd. 4, p. 436–438.) **PKA**

Gives conclusions of Payen regarding composition of starch.

439. **Poggendorff,** J. C. Elementar-Zusammensetzung der bischer zerlegten Substanzen organischen Ursprungs, nach den zuverlässigeren Angaben. (Annalen der Physik und Chemie, Poggendorff's, Leipzig, 1836, Bd. 37, p. 1–162.) **PAA**

On pages 114–160 is given a very complete resumé of previous work dealing with starch and its transformations.

440. **Dumas,** and others. Rapport sur un mémoire de M. Payen, relatif à l'analyse élémentaire de l'amidon et à celle de la dextrine. Par Dumas, Thénard and Dulong. (Académie des sciences, Comptes rendus, Paris, 1837, tome 5, p. 898–905; subsequent note by M. Biot, p. 905.) ***EO**

441. **Zulkowski,** Karl. Über die Einwirkung des Glycerins auf Stärke bei höheren Temperaturen. (Akademie der Wissenschaften zu Wien, Sitzungsberichte, Mathematisch-naturwissenschaftliche Classe, 1875, Bd. 72, Abt. 2, p. 384–388.) ***EF**

Also in *Wag. Jahr.,* 1878, Jahrg. 24, p. 753–756.

442. —— Über die Veränderungen der in heissem Glycerin gelösten Stärke. (Auszuge.) (Chemiker-Zeitung, Cöthen, 1888, Jahrg. 12, p. 341.) **†† VOA**

Finds starch is broken down by hot glycerol into a series of bodies which are separated by their varying solubility in alcohol. By precipitation of its Ba compound, a product is obtained which is soluble in an alcohol-ether mixture and, in some respects, resembles maltodextrin. See further *446.*

Abstract in *Jour. chem. soc.,* 1889, v. 56, p. 116; *Chem. Centr.,* 1888, p. 1060; *Jahresber. Chem.,* 1888, p. 2322.

443. **Brown,** Horace T., and G. Harris Morris. The determination of the molecular weights of the carbohydrates. Part 2. (Chemical Society of London, Journal, 1889, v. 55, p. 462–474.) **PKA**

Raoult's method points to a molecular weight of 20,000 to 30,000 for starch. Because various starch dextrins show an almost identical molecular weight, the starch molecule is believed to be composed of five amylin groups, the fifth being similar but resistant to hydrolyzing agents. From the observed molecular weight of the dextrins the calculated molecular weight of starch is 32,400.

Abstract in *Jour. soc. chem. ind.,* 1889, v. 8, p. 717.

444. **Scheibler,** C., and H. Mittelmeier. Studien über die Stärke. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1890, Jahrg. 23, p. 3060–3075.) **PKA**

A historical resume and theoretical discussion of the chemistry of starch is given. Experimental evidence is given to prove the aldehydic nature of dextrin. From commercial starch sugar have isolated an unfermentable compound which is isomeric with maltose.

Condensed in *Wag. Jahr.,* 1890, Jahrg. 36, p. 798–802.

Abstract in *Jour. soc. chem. ind.,* 1890, v. 9, p. 1140; *Chem. Centr.,* 1890, Bd. 2, p. 906; *Jour. chem. soc.,* 1891, v. 60, p. 33–34; *Bull. soc. chim. Paris,* 1891, série 3, tome 6, semestre 2, p. 676–678.

445. —— Entgegnung. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1890, Jahrg. 23, p. 3473.) **PKA**

A reply to Zulkowski (*entry 446*). Authors believe that the solubility of starch in hot glycerine has little bearing on the theory of its decomposition and also that starch will dissolve in similar liquids such as water or glycol if a sufficiently high temperature is reached.

446. **Zulkowski,** Karl. Studien über Stärke. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1890, Jahrg. 23, p. 3295–3297.) **PKA**

States that Scheibler and Mittelmeier (*entry 444*), in their review of starch chemistry, did not mention his recent article (*entry 442*). A summary of this work is given.

Abstract in *Jour. chem. soc.,* 1891, v. 60, p. 165; *Jour. soc. chem. ind.,* 1891, v. 10, p. 56; *Bull. soc. chim. Paris,* 1891, série 3, tome 6, p. 679; *Jahresber. Chem.,* 1890, p. 2151.

447. **Scheibler,** C., and H. Mittelmeier. Studien über die Stärke. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1893, Jahrg. 26, p. 2930–2937.) **PKA**

Reply to Lintner and Düll (*entry 248*). In an extension of their own theory, authors consider that starch is composed of a large number of glucose residues all combined by dicarbonyl linkings.

Condensed in *Bull. soc. chim. Paris,* 1894, série 3, tome 12, p. 581–585.

Abstract in *Jour. chem. soc.,* 1894, v. 66, part 1, p. 107.

Starches and Dextrins, continued.

Molecular Constitution, continued.

448. Zulkowski, Karl, and Boh. Franz. Die Veränderung der im heissen Glycerin gelösten Stärke. (Abgekürzt.) (Jahresbericht der chemischen Technologie, Wagner's, Leipzig, 1894, Jahrg. 40, p. 798–801.) **VOA**

At 190° soluble starch is formed, at 200° erythrodextrin, and at 210° achroodextrin. Describes these and also two alcohol soluble products formed by prolonged heating at 210°.

Abstract in *Jour. chem. soc.*, 1896, v. 70, part 1, p. 120; *Jour. soc. chem. ind.*, 1895, v. 14, p. 1053; *Chem. Centr.*, 1894, Bd. 2, p. 918.

449. Duclaux, E. Amidons, dextrine et maltose. (Institut Pasteur, Annales, Paris, 1895, tome 9, p. 214–223.) **QDA**

Criticizes the theory of Payen and Musculus. Suggests a molecular difference in the various starch varieties.

Abstract in *Chem. Centr.*, 1895, Bd. 1, p. 918.

450. Ost, H. Studien über der Stärke. (Chemiker-Zeitung, Cöthen, 1895, Jahrg. 19, p. 1501–1507.) **†† VOA**

A critical review of starch researches during the previous ten years. Discusses method of Sachsse and Effront for determination of starch, presents evidence that Lintner's "isomaltose" is not homogeneous, that maltosazone readily undergoes change, and that Fischer's "isomaltosazone" is maltosazone. Discusses dextrins and soluble starch. By method of Baumann obtains an ether soluble benzoyl derivative of Zulkowski's dextrin.

Abstract in *Jour. soc. chem. ind.*, 1895, v. 14, p. 877, 895; *Chem. Centr.*, 1895, Bd. 2, p. 593–594.

451. Lintner, Carl J. Zur Chemie der Stärke. (Chemiker-Zeitung, Cöthen, 1897, Jahrg. 21, p. 737–738, 752–754.) **†† VOA**

Discusses chemical nature and isolation of dextrins. The specific properties of amylodextrin, erythrodextrin, achroodextrin and isomaltose are discussed.

Abstract in *Jour. soc. chem. ind.*, 1897, v. 16, p. 1028; *Chem. Centr.*, 1897, Bd. 2, p. 841–842.

452. Skraup, Zdenko H. Notizen über Cellulose und Stärke. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1899, Jahrg. 32, p. 2413–2414.) **PKA**

After gently acetylating starch and saponifying, a substance is obtained similar to soluble starch. The corresponding product after a vigorous acetylation reduces Fehling's solution and gives no color with iodine.

Abstract in *Jour. soc. chem. ind.*, 1899, v. 18, p. 941; *Chem. Centr.*, 1899, Bd. 2, p. 752; *Bull. soc. chim. Paris*, 1900, série 3, tome 24, p. 619.

453. Syniewski, Wiktor. Ueber die Constitution der Stärke. (Liebig's Annalen der Chemie, Leipzig, 1899, Bd. 309, p. 282–315.) **PKA**

Studies action of boiling water on starch at various pressures, also action of KOH and malt amylase. The action of malt amylase is followed by determinations of the amount of sugar formed and by the iodine reaction. From these and previous results concludes that starch is an individual substance and that hydrolysis can proceed in two ways, by carbinol hydrolysis and by carbonyl hydrolysis. Formulas are given for the transformation.

Abstract in *Jour. chem. soc.*, 1900, v. 78, part 1, p. 78–79; *Chem. Centr.*, 1900, Bd. 1, p. 19–20.

Conclusions in *Bull. assoc. chimistes*, 1900–01, tome 18, p. 701–702; *Bull. soc. chim. Paris*, 1900, série 3, tome 24, p. 267–268.

454. Fenton, H. J. H., and Mildred Gostling. The action of hydrogen bromide on carbohydrates. (Chemical Society, Journal, London, 1901, v. 79, p. 361–365.) **PKA**

Certain carbohydrates yield ω-bromomethylfurfural when treated with dry HBr in ethereal solution. The reaction appears to be limited to "ketonic" carbohydrates. Various starches yielded about 4.5% and dextrins 5 to 8% of the bromomethylfurfural. Conclude that starch and dextrins contain a small proportion of groups or nuclei identical with those in laevulose.

Abstract in *Bull. soc. chim. Paris*, 1901, série 3, tome 26, p. 341.

455. Hale, F. E. Upon the structure of the starch molecule. (School of Mines quarterly, New York, 1903, v. 24, p. 145–170.) **OA**

456. Kiliani, H. Über die Formeln der Polysaccharide. (Chemiker-Zeitung, Cöthen, 1908, Jahrg. 32, p. 366.) **VOA**

457. Wacker, Leonhard. Eine colorimetrische Methode zur Bestimmung der Molekulargrösse von Kohlehydraten. (Qualitativer Nachweis von Aldehyden, Alkoholen und Kohlehydraten.) (Deutsche chemische Gesellschaft, Berichte, Berlin, 1908, Jahrg. 41, p. 266–275.) **PKA**

Method is based on development of a red coloration with an alkaline solution of phenylhydrazine sulphonic acid. The intensity of the coloration is constant for equimolecular concentrations of various carbohydrates and the velocity of the reaction is inversely proportional to the size of the molecule. Starch and amylodextrin are found to have three times the molecular weight of maltose, and erythrodextrin twice that of maltose.

Abstract in *Jour. chem. soc.*, 1908, v. 94, part 1, p. 135; *Chem. abst.*, 1908, v. 2, p. 1251; *Chem. Centr.*, 1908, Bd. 2, p. 989; *Bull. soc. chim. Paris*, 1909, série 4, tome 6 p. 497.

Starches and Dextrins, continued.

Molecular Constitution, continued.

458. **Ling,** Arthur R. A short review of our knowledge of starch. (Abstract.) (International Congress of Applied Chemistry, 7th, London, 1909, [Proceedings], section 6b, p. 123–124.) **PKR**

Reprint in *Jour. soc. chem. ind.*, 1909, v. 28, p. 731; *Chem. abst.*, 1910, v. 4, p. 1697.

459. **Wacker,** Leonhard. Eine colorimetrische Methode zur Bestimmung der Molekulargrösse von Kohlehydraten. (Unterscheidung der primären von den sekundären und tertiären Alkoholen.) (Deutsche chemische Gesellschaft, Berichte, Berlin, 1909, Jahrg. 42, p. 2675–2680.) **PKA**

Higher concentrations of NaOH are used than in *entry 457*. Using dextrose as standard and expressing results in terms of hexose molecules, soluble starch is equal to 7, granulose to 5, starch cellulose to 8, and achroo- and erythrodextrins to 4.

Abstract in *Jour. soc. chem. ind.*, 1909, v. 28, p. 898; *Chem. abst.*, 1909, v. 3, p. 2575; *Chem. Zentr.*, 1909, Bd. 2, p. 867; *Jour. chem. soc.*, 1909, v. 96, part 1, p. 633; *Bull. soc. chim. Paris*, 1910, série 4, tome 8, p. 1171.

460. —— Zur colorimetrischen Methode der Bestimmung der Molekulargrösse von Polysacchariden. (Zeitschrift für physiologische Chemie, Hoppe-Seyler's, Strassburg, 1911, Bd. 71, p. 143–152.) **PKA**

Results for starch and dextrins are similar to those obtained previously.

Abstract in *Chem. Zentr.*, 1911, Bd. 1, p. 1380; *Chem. abst.*, 1911, v. 5, p. 2640; *Bull. soc. chim. Paris*, 1912, série 4, tome 12, p. 383.

461. **Clark,** Ernest D. The origin and significance of starch. (International Congress of Applied Chemistry, 8th, Washington and New York, 1912, Original communications, v. 19, p. 55–69.) **PKR**

Discusses briefly the formation, physical and chemical nature and industrial importance of starch.

Condensed in *Scientific American supplement*, New York, 1913, v. 76, p. 318–320.

462. **Frankforter,** G. B. The chemistry of starch. (International Congress of Applied Chemistry, 8th, Washington and New York, 1912, Original communications, v. 13, p. 133–145.) **PKR**

A review.

Abstract in *Chemiker-Zeitung*, Cöthen, 1912, Jahrg. 36, p. 1078.

463. **Pringsheim,** Hans. Über den gegenwärtigen Stand der Stärkechemie. (Die Landwirtschaftlichen Versuchs-Stationen, Berlin, 1914, Bd. 84, p. 267–282.)

Available in Library of the Chemists' Club.

Discusses recent advances and formulates hypothesis for starch hydrolysis.

Abstract in *Chem. Zentr.*, 1914, Bd. 2, p. 565.

464. **Thomas,** Arthur W. The chemical constitution of starch. (Biochemical bulletin, New York, 1915, v. 4, p. 379–397.) **PPB**

A thorough survey of previous literature in which preference is given to the formula proposed by Syniewski.

465. **Pictet,** Amé, and Jean Sarasin. Sur la distillation de la cellulose et de l'amidon dans le vide. (Académie des sciences, Comptes rendus, Paris, 1918, tome 166, p. 38–39.) ***EO**

By distillation under pressure of 12–15 mm. obtain from cotton cellulose, starch and dextrin a crystalline substance with the composition of $C_6H_{10}O_5$, apparently identical with the laevoglucosan obtained by Tanret. Suggest that it is a simple depolymerization product.

Abstract in *Jour. soc. chem. ind.*, 1918, v. 37, p. 49A; *Chem. Zentr.*, 1918, Bd. 1, p. 1150; *Bull. soc. chim. France*, 1918, série 4, tome 24, p. 439.

466. —— Sur la distillation de la cellulose et de l'amidon sous pression réduite. (Helvetica chimica acta, Basileae and Genevae, 1918, v. 1, p. 87–96.) **PKA**

More detailed account of above.

In addition, distill in vacuo the successive products of starch hydrolysis namely, dextrin, maltose and glucose. In each case small quantities of laevoglucosan are obtained. Advance a possible formula for the compound and discuss constitution of starch and cellulose molecules.

Abstract in *Chem. abst.*, 1918, v. 12, p. 2187; *Chem. Zentr.*, 1918, Bd. 2, p. 710; *Bull. soc. chim. France*, 1919, série 4, tome 26, p. 398.

467. **Pictet,** Amé. Sur la transformation de la lévoglucosane en dextrine. (Helvetica chimica acta, Basileae and Genevae, 1918, v. 1, p. 226–230.) **PKA**

In the presence of Pt black at 180°, 1-glucosan is converted into a white amorphous powder; the composition, molecular weight, and chemical properties of this polymerized product correspond in general to that of a dextrin of the composition $(C_6H_{10}O_5)_4$.

Abstract in *Chem. abst.*, 1919, v. 13, p. 313; *Chem. Zentr.*, 1919, Bd. 1, p. 350; *Bull. soc. chim. France*, 1919, série 4, tome 26, p. 399.

468. **Sarasin,** Jean. Recherches sur la cellulose et l'amidon. (Archives des sciences physiques et naturelles, Genève, 1918, v. 46, p. 5–32.) **OA**

Principally a review of the previous work carried out by the author in conjunction with Pictet.

Abstract in *Jour. chem. soc.*, 1918, v. 114, part 1, p. 375; *Chem. Zentr.*, 1918, Bd. 2, p. 528–530.

Starches and Dextrins, continued.

Molecular Constitution, continued.

469. Karrer, Paul. Glucoside 6. Beitrag zur Konstitution und Konfiguration der Glucoside. (Helvetica chimica acta, Basileae et Genevae, 1920, v. 3, p. 258–260.) **PKA**

Because β-glucose and β-glucosides yield considerable quantities of laevoglucosan and α-glucose yields only traces of laevoglucosan on vacuum distillation, author suggests that starch and cellulose may contain β-glucosidic linkages.

Abstract in *Jour. chem. soc.*, 1920, v. 118, part 1, p. 370; *Chem. Zentr.*, 1920, Bd. 1, p. 806.

470. —— Zur Kenntnis der Polysaccharide I. Methylierung der Stärke. (Helvetica chimica acta, Basileae and Genevae, 1920, v. 3, p. 620–625.) **PKA**

Starch is methylated by treating it with MeI and silver oxide in water. Three products obtained contain respectively 1, 1.5 and 2 methoxy groups per $C_6H_{10}O_5$ grouping. Believes that methylation is accompanied by a depolymerization of the crystalloid, so that the methylated product represents the simple molecule.

Abstract in *Jour. chem. soc.*, 1920, v. 118, part 1, p. 820; *Chem. abst.*, 1921, v. 15, p. 61; *Chem. Zentr.*, 1920, Bd. 3, p. 880; *Bull. soc. chim. France*, 1921, série 4, tome 30, p. 583.

471. Pictet, Amé. La distillation sèche dans le vide et son application à l'étude des hydrates de carbone. (Société chimique de France, Bulletin, Paris, 1920, tome 27, p. 641–656.) **PKA**

An address before the Société chimique de France. It is stated that laevoglucosan obtained by vacuum distillation of starch, may be polymerized to a dextrin, which yields glucose upon acid hydrolysis. Polymerization of an equimolecular mixture of glucosan and 1-glucosan yields a dextrin, from which maltose may be obtained by carefully controlled acid hydrolysis.

472. Reychler, Albert. Revue de quelques travaux sur l'amidon. (Société chimique de Belgique, Bulletin, Gand, 1920, tome 29, p. 113–118.) **PKA**

473. Irvine, James C., and J. W. Oldham. The constitution of polysaccharides, 3. The relationship of 1-glucosan to d-glucose and to cellulose. (Chemical Society of London, Journal, 1921, v. 119, p. 1744–1759.) **PKA**

Confirm the preparation of 1-glucosan by vacuum distillation of starch or cellulose, as carried out by Pictet and Sarasin. Present evidence that 1-glucosan is 1:6-β-glucosan. Formation of β-glucosan during dry distillation is believed to be due to production of acids, which hydrolyze the polysaccharide to glucose, the β form of which undergoes dehydration and distills forward as the anhydride.

Abstract in *Chem. abst.*, 1922, v. 16, p. 411; *Chem. Zentr.*, 1922, Bd. 1, p. 678; *Bull. soc. chim. France*, 1922, série 4, tome 32, p. 1719.

474. Karrer, Paul, and C. Nägeli. Zur Kenntnis der Polysaccharide, 4. Über den Aufbau der Kartoffelstärke. (Helvetica chimica acta, Basileae et Genevae, 1921, v. 4, p. 185–202.) **PKA**

Potato starch was methylated (1) by methyl iodide and silver oxide, (2) by dimethyl sulphate and baryta water and (3) by dimethyl sulphate and NaOH. By (2) 3 products were obtained, a representative sample containing 31.2% methoxyl and a molecular weight in aqueous solution of 991–1026 by freezing point method. All 3 products are not degraded bv amylase, ptyalin or B. macerans, and are not transported by a current of 60 volts. By (3) a methylation of 35.3% was obtained. As it has been previously shown that methylation does not affect glucosidic linkings, believe that the ultimate starch molecule does not contain more than 6 glucose residues and that ordinary starch is built up from these molecules by a process of association.

Abstract in *Chem. abst.*, 1921, v. 15, p. 2629–2631; *Jour. chem. soc.*, 1921, v. 120, part 1, p. 311–312; *Chem. Zentr.*, 1921, Bd. 1, p. 934–935; *Bull. soc. chim. France*, 1921, série 4, tome 30, p. 1169–1171.

475. Karrer, Paul. (Polysaccharide XII.) Zur Kenntnis des Glykogens. (Helvetica chimica acta, Basileae et Genevae, 1921, v. 4, p. 994–1000.) **PKA**

The properties of methylo-glycogen are shown to agree in detail with those of methylo-starch. Starch and glycogen both yield acetobromomaltose when treated with acetyl bromide and their NaOH addition compounds have the same composition. The observed differences between starch and glycogen are attributed to the presence of impurities and to a different degree of polymerization.

Abstract in *Jour. chem. soc.*, 1922, v. 122, part 1, p. 11; *Chem. Zentr.*, 1922, Bd. 3, p. 428; *Bull. soc. chim. France*, 1922, série 4, tome 32, p. 860.

476. —— Der Aufbau der Stärke und des Glykogens. (Naturwissenschaften, Berlin, 1921, Jahrg. 9, p. 399–403.) **OA**

A review of previous work in which author discusses (1) the methylation of starch, (2) the constitution of amyloses formed by action of B. macerans on starch, and (3) the acetylation of starch. Starch and glycogen are believed to be polymerized anhydrides of maltose of comparatively low molecular weight.

Abstract in *Chem. abst.*, 1922, v. 16, p. 2314; *Chem. Zentr.*, 1921, Bd. 3, p. 214.

477. Pictet, Amé, and Jacques Pictet. Sur la polymerisation des glucosanes. (Acadé-

Starches and Dextrins, continued.

Molecular Constitution, continued.

mie des sciences, Comptes rendus, Paris, 1921, tome 173, p. 158–160.) ***EO**

Glucosan heated with $ZnCl_2$ at 135° under 15 mm. pressure yielded diglucosan and at atmospheric pressure a tetraglucosan. Similarly, tetra-laevoglucosan is obtained from laevoglucosan at 155° and atmospheric pressure. By polymerization of a mixture of the two glucosans, obtained a product, which gave evidence of yielding maltose upon hydrolysis with oxalic acid. All the polymerized products resemble the dextrins, in some respects.

Abstract in *Jour. chem. soc.*, 1921, v. 120, part 1, p. 647; *Chem. Zentr.*, 1921, Bd. 3, p. 822. Reprinted in further detail in *Helvetica chimica acta*, 1921, v. 4, p. 788–795. Abstract in *Jour. chem. soc.*, 1921, v. 120, part 1, p. 766.

478. **Samec,** Max, and V. Ssajevič. Sur la composition de l'agar. (Académie des sciences, Comptes rendus, Paris, 1921, tome 173, p. 1474–1475.) ***EO**

Draws an analogy between starch and agar.

Abstract in *Bull. soc. chim. France*, 1922, série 4, tome 32, p. 463.

479. **Hoop,** L. de. Nieuwe opvattingen over de constitutie der koolhydraten. (Chemisch weekblad, Amsterdam, 1922, jaarg. 19, p. 106–107.)

Available in Library of the Chemists' Club.

A discussion on the constitution of starch.

Abstract in *Bull. soc. chim. France*, 1922, série 4, tome 32, p. 1040–1041.

480. **Irvine,** James C. Some research problems in the carbohydrates. — Starch. With John MacDonald. (British Association for the Advancement of Science, Report, 90th meeting, 1922, p. 40–45.) ***EC**

States that, upon repeated methylation of starch with methyl sulphate, a definite product containing 37% MeO is obtained. This methylated starch, upon digestion with alcoholic HCl, is converted into dimethyl methyl glucoside and trimethyl methyl glucoside in the ratio of 2 to 1; these glucosides are subsequently hydrolyzed to the parent sugars, the trimethyl methyl glucoside yielding 2–3–6 trimethyl glucose. Authors propose a formula which is intended to accommodate these observations; 3 glucose residues are connected in the fundamental unit of starch, one hexose residue containing 3 methyl groups, 4 other methyl groups being shared between the two remaining glucose residues. The formulae of Karrer are criticized. Have obtained evidence that N is not present in starch as an adventitious impurity.

Condensed in *Jour. soc. chem. ind.*, 1922, v. 41, p. 363–364R.

481. —— Some research problems in the carbohydrates. — Synthetic dextrins. With J. W. H. Oldham. (British Association for the Advancement of Science, Report, 90th meeting, 1922, p. 46.) ***EC**

Their methylation process is applied to the synthetic dextrins formed by polymerization of β–glucosan, after the method of Pictet. Large quantities of 2, 3, 5, 6–tetramethyl glucose are formed indicating that the synthetic dextrins are complex polyglucose-glucosides and not related structurally to starch.

482. **Karrer,** Paul, and J. O. Rosenberg. Über Sublimationsversuche mit Kohlenhydraten. (Helvetica chimica acta, Basileae and Genevae, 1922, v. 5, p. 575–576.) **PKA**

A small amount of laevoglucosan was obtained as a sublimate upon heating starch at 190–220° under ordinary pressure. Similarly laevoglucosan was obtained from α-tetra-amylose.

Abstract in *Jour. chem. soc.*, 1922, v. 122, part 1, p. 812; *Chem. Zentr.*, 1922, Bd. 3, p. 667; *Bull. soc. chim. France*, 1923, série 4, tome 34, p. 51.

483. **Karrer,** Paul. Der Aufbau der polymeren Kohlenhydrate. (Ergebnisse der Physiologie, München und Wiesbaden, 1922, Bd. 20, p. 433–476.) **QCA**

A review of the author's work.

484. **Pictet,** Amé, and R. Jahn. Sur un nouveau produit de dépolymérisation de l'amidon. (Helvetica chimica acta, Basileae and Genevae, 1922, v. 5, p. 640–644.) **PKA**

Potato starch is heated in glycerine at 200–210°, the glycerin removed by vacuum distillation at the same temperature, and the dry residue purified by dissolving in water and precipitating with alcohol. The product, termed trihexosan $(C_6H_{10}O_5)_3$, is not identical with tri-amylose, iso-triamylose or β-hexa-amylose. Determine its physical properties and those of its nona-acetate. The isolation of this new trihexosan indicates that the fundamental unit of starch is composed of 3 hexose residues.

Abstract in *Chem. abst.*, 1923, v. 17, p. 270; *Chem. Zentr.*, 1923, Bd. 1, p. 1016; *Jour. chem. soc.*, 1922, v. 122, part 1, p. 987; *Bull. soc. chim. France*, 1923, série 4, tome 34, p. 270.

485. **Pictet,** Amé, and J. H. Ross. Sur la polymérisation de la lévoglucosane. (Académie des sciences, Comptes rendus, Paris, 1922, tome 174, p. 1113–1114.) ***EO**

When laevoglucosan is polymerized by heat in the presence of $ZnCl_2$ the degree of polymerization increases as the pressure increases. Have obtained a series of laevoglucosans containing 2, 4, 6, and 8 hexose residues, the highest member, octalaevoglucosan being obtained at a pressure of 13 atmospheres. As the molecular weight in-

Starches and Dextrins, continued.

Molecular Constitution, continued.

creases the properties of these compounds approach those of the dextrins.

Reprinted in further detail in *Helvetica chimica acta*, 1922, v. 5, p. 876–883.

Abstract in *Chem. abst.*, 1922, v. 16, p. 2313; *Chem. Zentr.*, 1922, Bd. 3, p. 346; *Bull. soc. chim. France*, 1922, série 4, tome 32, p. 1397; *Jour. chem. soc.*, 1922, v. 122, part 1, p. 525.

486. **Pringsheim,** Hans. Problematisches aus der Polysaccharidchemie. (Zeitschrift für angewandte Chemie, Leipzig, Jahrg. 35, 1922, p. 345–349.) **PKA**

Under the same subheadings as used by Karrer (*entry 643*), gives a critical discussion of the theories which the latter has advanced.

Abstract in *Chem. Zentr.*, 1922, Bd. 3, p. 1038.

487. **Zwikker,** J. J. L. Sur la constitution des polysaccharides. (Recueil des travaux chimiques des Pays-Bas, Leyde, 1922, tome 41, p. 49–53.) **PKA**

States that majority of investigators believe cellulose and starch are built up of units containing 4–9 hexose residues. Believes a 3 plane system of representation is most logical. The structures of cellulose and starch are represented by a triangular prism and tetrahedron, respectively.

Abstract in *Chem. abst.*, 1922, v. 16, p. 1216; *Bull. soc. chim. France*, 1922, série 4, tome 32, p. 1246.

488. —— Sur la constitution des polysaccharides. (Recueil des travaux chimiques des Pays-Bas, 1922, tome 41, p. 152.) **PKA**

The proposed formula for starch in *entry 487* is at variance with the empirical formula n($C_6H_{10}O_5$). Suggests that starch, like other polyvalent alcohols, loses water of constitution when exposed to elevated temperatures.

Abstract in *Chem. Zentr.*, 1923, Bd. 1, p. 1077.

489. **Irvine,** James C. Some constitutional problems of carbohydrate chemistry. (Chemical Society of London, Journal, 1923, v. 123, p. 898–921.) **PKA**

Discusses methylation as a method of establishing the constitution of carbohydrates. Discussion regarding starch is essentially the same as *entry 480*. Believes that the starch molecule contains 3 glucose units arranged in such a manner that one pair displays the coupling present in maltose, while another pair reproduces the linkage characteristic of cellulose.

Also in *Chemical reviews*, Baltimore, 1925, v. 1, p. 41–71, *PKA*.

490. **Karrer,** Paul. Polysaccharide. 20. Zur Kenntniss polymerer Kohlenhydrate. (Helvetica chimica acta, Basileae et Genevae, 1923, v. 6, p. 402–409.) **PKA**

When Zulkowski's soluble starch and maltose are treated separately with acetyl bromide, equal amounts of acetylbromomaltose are obtained. Only a trace of tetraacetyl glucose is found, although it is shown that glucose may be recovered as such when is previously mixed with the starch. Regarded as decisive evidence against the fundamental unit of starch being a trisaccharide, as postulated by Irvine and by Pictet.

Abstract in *Jour. chem. soc.*, 1923, v. 124, part 1, p. 655; *Chem. Zentr.*, 1923, Bd. 3, p. 1005; *Bull. soc. chim. France*, 1923, série 4, tome 34, p. 2122.

491. —— Neuere Anschauungen über den Aufbau der polymeren Kohlenhydrate. (Deutsche medizinische Wochenschrift, Leipzig, 1923, Jahrg. 49, p. 1074–1075.)

Available in Library of the Academy of Medicine.

A review of the recent advances, especially that carried out by the author and his co-workers.

Abstract in *Chem. Zentr.*, 1923, Bd. 3, p. 1150.

492. **Ling,** Arthur R. Some recent advances in our knowledge of the chemistry of starch. (Society of Chemical Industry, Journal, London, 1923, v. 42, p. 1036–1037R.) **VOA**

Summary of an address delivered before the Birmingham University Chemical Society.

493. **Samec,** Max, and V. Ssajevič. Sur la composition du glycogen. (Académie des sciences, Comptes rendus, Paris, 1923, tome 176, p. 1419–1421.) ***EO**

A comparison of starch and glycogen shows that their molecular weights are of the same magnitude. Glycogen solutions are of lower viscosity and yield less gel on electro-dialysis, the accompanying sol having a higher P content but lower conductivity than a corresponding potato starch sol. The major portion of the P in glycogen is in the sol.

Abstract in *Chem. abst.*, 1923, v. 17, p. 2891; *Jour. chem. soc.*, 1923, v. 124, part 1, p. 656; *Chem. Zentr.*, 1923, Bd. 3, p. 1070.

494. **Pictet,** Amé, and Paul Stricker. Sur une hexahexosane retirée de l'amidon. (Helvetica chimica acta, Basileae et Genevae, 1924, v. 7, p. 932–933.) **PKA**

The depolymerization of starch by heating with glycerol to 200° (*entry 484*), was interrupted at the stage giving a red coloration with I. By fractionation with alcohol, obtain a trihexosan and a hexahexosan, the latter yielding trihexosan nonacetate when heated with acetic anhydride and Na acetate.

Abstract in *Chem. abst.*, 1925, v. 19, p. 976; *Chem. Zentr.*, 1924, Bd. 2, p. 2519.

Starches and Dextrins, continued.

Molecular Constitution, continued.

495. **Pictet**, Amé, and RACHEL SALZMANN. Sur la trihexosane. (Helvetica chimica acta, Basileae et Genevae, 1924, v. 7, p. 934–935.) **PKA**

Trihexosan, the ultimate product of depolymerization of starch by heat, is attacked by emulsin yielding dextrose and a dihexosan. The latter is fully described. Believe the trihexosan is a β-glucosyl-dihexosan.

Abstract in *Chem. abst.*, 1925, v. 19, p. 976; *Chem. Zentr.*, 1924, Bd. 2, p. 2519.

496. **Pringsheim**, Hans. Polymerisation und Association in der Kohlenhydratchemie. (Naturwissenschaften, Berlin, 1924, Jahrg. 12, p. 360–364.) **OA**

A review.

497. **Sjöberg**, Knut. Nyare teorier om stärkelsens konstitution. (Svensk kemisk tidskrift, Stockholm, 1924, v. 36, p. 81–88.) **PKA**

A review of the literature, chiefly that since 1913.

Abstract in *Chimie et industrie*, 1924, v. 12, p. 837.

498. **Venn**, H. J. P. Yield of β-glucosan obtained from low-pressure distillation of cellulose. (Textile Institute, Journal, Manchester, 1924, v. 15, p. 414–418T.) **VLA**

In the distillation of cellulose and starch, notes that the acidity of the distillate is always lowest when the yield of β-glucosan is highest; this observation is at variance with the view of Irvine and Oldham (*entry 473*) that the formation of β-glucosan during dry distillation is due to the production of acids.

499. **Castan**, Pierre, and AMÉ PICTET. Sur l'hexosane et la trihexosane. (Helvetica chimica acta, Basileae et Genevae, 1925, v. 8, p. 946–948.) **PKA**

Abstract in *Chem. abst.*, 1926, v. 20, p. 1598.

500. **Irvine**, James C., and J. W. H. OLDHAM. Polymerization of β-glucosan. The constitution of synthetic dextrins. (Chemical Society of London, Journal, 1925, v. 127, p. 2903–2922.) **PKA**

Abstract in *Chem. abst.*, 1926, v. 20, p. 743.

501. **Karrer**, Paul. Bemerkungen betr. Isolichenin und Stärkeabbau. (Zeitschrift für physiologische Chemie, Hoppe-Seyler's, Berlin und Leipzig, 1925, Bd. 148, p. 62–64.) **PKA**

Abstract in *Chem. abst.*, 1926, v. 20, p. 382.

502. **Klason**, Peter, and KNUT SJÖBERG. Om amylos-oktodextrin. (Svensk kemisk tidskrift, Stockholm, 1925, årg. 37, p. 290–295.) **PKA**

Also in *Deutsche chemische Gesellschaft, Berichte*, Berlin, 1926, Jahrg. 59, p. 40–45.

Abstract in *Chem. abst.*, 1926, v. 20, p. 1222.

503. **Pictet**, Amé, and RACHEL SALZMANN. Sur la dihexosane et la tétrahexosane. (Helvetica chimica acta, Basileae et Genevae, 1925, v. 8, p. 948–949.) **PKA**

Abstract in *Chem. abst.*, 1926, v. 20, p. 1598.

504. **Pringsheim**, Hans, and JESAIA LEIBOWITZ. Über die Beziehung zwischen optischem Drehungsvermögen und Struktur in der Polysaccharid-Chemie. (Deutsche chemische Gesellschaft, Berichte, Berlin, 1925, Jahrg. 58, p. 2808–2814.) **PKA**

Abstract in *Chem. abst.*, 1926, v. 20, p. 1390.

COMPONENTS OF STARCH GRANULE

505. **Raspail**. Développement de la fécule dans les organes de la fructification des céréales, et analyse microscopique de la fécule, suivie d'expériences propres à en expliquer la conversion en gomme. (Annales des sciences naturelles, Paris, 1825, tome 6, p. 224–239, 384–427.) **PQA**

506. —— Résponse au Mémoire de M. Caventou. (Annales de chimie et de physique, Paris, 1826, tome 33, p. 241–265.) **PAA**

A reply to the article of Caventou.

507. **Guibort**. Extrait d'un Mémoire sur l'amidon. (Annales de chimie et de physique, Paris, 1829, tome 40, p. 183–193.) **PAA**

Finds the outer coating and inner soluble matter are colored equally by iodine and that the coloration is not due to a volatile principal as suggested by Raspail. Various amylaceous materials are compared.

Reprinted in *Journal für technische und ökonomische Chemie*, Erdmann's, 1829, Bd. 5, p. 169–192, *PKA*.

Abstract in *American journal of science and arts*, New Haven, 1833, v. 24, p. 371.

508. **Raspail**. Essai di chimie microscopique. (Annales des sciences d'observation, Paris, 1829, tome 2, p. 430–445; 1830, tome 3, p. 216–228, 368–386; 1830, tome 4, p. 65–81, 225–251, continued.)

Available in Library of the American Museum of Natural History.

509. **Fritzsche**, Julius. Ueber das Amylum. (Annalen der Physik und Chemie, Poggendorff's, Leipzig, 1834, Bd. 32, p. 129–160.) **PAA**

A criticism of Raspail's theories as to the structure of the starch granule.

Abstract in *Annalen der Pharmacie*, 1834, Bd. 12, p. 263–264.

Starches and Dextrins, continued.

Components of Starch Granule, continued.

510. **Guérin-Varry,** R. T. Mémoire sur deux produits naturels de la végétation considérés comme des gommes. (Annales de chimie et de physique, Paris, 1834, tome 56, p. 225–252.) **PAA**

Première partie. 1. De la partie soluble de l'amidon. 2. Préparation de l'amidine. 3. Composition et propriétés de l'amidine. 4. Amidin tégumentaire. 5. Amidin soluble.

Reprinted in *Journal für praktische Chemie,* 1835, Bd. 3, p. 329–349, *PKA.*

Abstract in *Annalen der Pharmacie,* 1835, Bd. 13, p. 71–75.

511. —— Réponse à la note de M. Payen insérée dans le tome 56 des Annales de chimie et de physique, page 370. (Annales de chimie et de physique, Paris, 1834, tome 57, p. 108–110.) **PAA**

512. —— Sur l'amidon. (L'Institut, Paris, 1835, année 3, p. 156–158; 1836, année 4, p. 35–36.)

Available in Library of the Engineering Societies.

Also in *Jour. prakt. chem.,* 1836, Bd. 7, p. 205–210; *Philosophical magazine,* London, 1836, v. 8, p. 586–588.

513. —— Deuxième mémoire sur l'amidon de pommes de terre. (Académie des sciences, Comptes rendus, Paris, 1836, tome 2, p. 116–119.) ***EO**

Pure starch is composed of amidin, soluble amidin and tegumentary amidin. Studies action of diastase and sulphuric acid, under various conditions, on these substances.

Reprinted in further detail in *Annales de chimie et de physique,* 1836, série 2, tome 61, p. 66–94, *PAA.*

514. **Muenter,** Julius. Ueber das Amylum der Gloriosa superba L. (Botanische Zeitung, Berlin, 1845, Jahrg. 3, p. 193–205.) **QEA**

Believes that the layers of the starch-grain originate by centripetal deposition.

515. **Payen,** A. Note sur la préexistence d'une huile essentielle, cause de l'odeur spéciale de la fécule. (Académie des sciences, Comptes rendus, Paris, 1846, tome 23, p. 487–490.) ***EO**

Starch is saccharified by dilute H_2SO_4 and the mixture fractionally distilled; certain portions of the distillate contain small amounts of a yellowish oil with an intense odor. The characteristic odor of starch is attributed to the preexistence of this oil.

Condensed in *Ding. poly. Jour.,* 1846, Bd. 102, p. 323–324.

516. **Reissek.** Über die Zellnatur der Amylumkörner. (Auszug.) (Flora, oder allgemeine botanische Zeitung, Regensburg, 1847, Jahrg. 30, p. 13–14.) **QEA**

Regards starch grains as undeveloped cells.

517. **Masche,** O. Ueber die Amylonbläschen des Weizenkorns. (Journal für praktische Chemie, Leipzig, 1852, Bd. 56, p. 400–410.) **PKA**

Microscopic examination of wheat starch granules. Concludes that the grains have the form of membranous vesicles, the peripheral layer consisting of cellulose, which in starch paste does not stain blue with iodine.

518. **Crueger,** Hermann. Beitrag zur Stärkemehlkunde. (Botanische Zeitung, Berlin, 1854, Jahrg. 12, p. 41–50.) **QEA**

Believes that starch-grains grow by external accretion, and that the outer layers are the youngest and last formed.

519. **Field,** James John. On the structure of the starch granule. (Pharmaceutical journal and transactions, London, 1854–55, v. 14, p. 253–256.) **WTA**

520. **Grundy.** On the structure of the starch granule. (Pharmaceutical journal and transactions, London, 1854–55, v. 14, p. 446–449.) **WTA**

521. **Harting,** Th. Ueber der Bau des Stärkemehls. (Botanische Zeitung, Berlin, 1855, Jahrg. 13, p. 905–911.) **QEA**

Finds that in the early stages of development of the starch-grain an integument is present, this being especially prominent in the starch of the potato tuber.

522. **Naegeli,** Carl W. Über das Stärkemehl. (Flora, oder allgemeine botanische Zeitung, Regensberg, 1856, Jahrg. 14, p. 602–607.) **QEA**

523. **Melsens.** Stärkemehlkörner. (Auszug.) (Jahresbericht der Chemie, Giessen, 1857, p. 493.) **PKA**

Starch grains are treated with organic acids and diastase and the I colorations noted. Believes the hull substance is composed of a nitrogenous substance and a substance similar to cellulose.

524. **Naegeli,** Carl W. Die Stärkekörner. (Pflanzenphysiologischer Untersuchungen, Zürich, 1858, Heft 2, 624 p.)

Available in Library of Columbia University.

525. **Mohl,** Hugo von. Ueber den vorgeblichen Gehalt der Stärkekörner an Cellulose. (Botanische Zeitung, Leipzig, 1859, Jahrg. 17, p. 225–229, 233–237.) **QEA**

Starches and Dextrins, continued.

Components of Starch Granule, continued.

The so-called starch cellulose is shown to differ from wood cellulose in both physical and chemical properties. Proposes the name farinose for this substance.

526. **Naegeli,** Carl W. Die Reaction von Jod auf Stärkekörner und Zellmembranen. (Königliche Bayerische Akademie der Wissenschaften, Sitzungsberichte, München, 1862, Bd. 2, p. 280–313.) ***EE**

527. —— Über die Reaction von Jod auf Stärkekörner und Zellmembranen. (Königliche Bayerische Akademie der Wissenschaften, Sitzungsberichte, München, 1863, Bd. 1, p. 161–199.) ***EE**

528. —— Ueber die chemische Verschiedenheit der Störkekörner. (Königliche Bayerische Akademie der Wissenschaften, Sitzungsberichte, München, 1863, Bd. 2, p. 272–293.) ***EE**

Finds potato and wheat starches are affected differently by the action of acids, alkalis, I and cupro-ammonium. Concludes, however, that the components, granulose and cellulose, are of the same chemical nature in both starches.

Duplicate abstracts in *Chem. Zentr.*, 1865, p. 494, and *Wag. Jahr.*, 1865, Jahrg. 11, p. 463.

529. —— Über die Reaction von Jod auf Stärkekörner und Zellenmembranen. (Neues Repertorium für Pharmacie, Buchner's, München, 1863, Bd. 12, p. 154–184, 497–530; 1864, Bd. 13, p. 145–181, 241–261.)

Available in Library of the Surgeon General's Office.

Taken from the *Sitzungsberichte* of the Königliche Bayerische Akademie der Wissenschaften zu München.

530. **Jessen,** Carl. Bestandtheile und Zerlegung der Stärkemehlkörner. (Journal für praktische Chemie, Leipzig, 1868, Bd. 105, p. 65–75.) **PKA**

Severely criticizes the policy of treating starch as an individual substance, as has been followed by various current treatises. Discusses nature of the hull substance which is insoluble in hot and cold water, the material which is soluble in cold water and the material which is insoluble in cold water but soluble in hot water.

Condensed in *Wag. Jahr.*, 1869, Jahrg. 15, p. 390–396.

531. **Hartig,** Th. Über den Bau des Stärkemehls. (Akademie der Wissenschaften zu Wien, Sitzungsberichte, Mathematisch-naturwissenschaftliche Classe, 1873, Bd. 63, Abt. 2, p. 505–512.) ***EF**

Abstract in *Jahresber. Chem.*, 1871, p. 789.

532. **Naegeli,** Carl W. Beiträge zur näheren Kenntniss der Stärkegruppe. (Annalen der Chemie, Liebig's, Leipzig und Heidelberg, 1874, Bd. 173, p. 218–227.) **PKA**

Finds that by treatment with dilute acids in the cold, starch may be separated principally into two modifications one of which is soluble in water, gives a blue I coloration and constitutes the inner portion of the granules, the other is insoluble in water, gives a yellow I coloration and constitutes the hull substance of the granule. The two modifications do not occur as distinct entities but are connected by transition stages. The most extreme form of this second component appears to be identical with cellulose. Amylodextrin is obtained in solution when this second component is submitted to the prolonged action of boiling water. A more detailed pamphlet published in Leipzig, 1874 (Available in Library of the Department of Agriculture).

Abstract in *Jour. chem. soc.*, 1875, v. 28, p. 55; *Chem. Centr.*, 1874, p. 809–813; *Wag. Jahr.*, 1874, Jahrg. 20, p. 653–657; *Jahresber. Chem.*, 1874, p. 878.

533. **Musculus,** Fritz. Ueber die Modification, welche die Stärke in physikalischer Hinsicht erleidet. (Botanische Zeitung, Leipzig, 1879, Jahrg. 37, p. 345–351.) **QEA**

Shows that the amylo-cellulose of Nägeli is an insoluble modification of granulose. Granulose can be transformed into cellulose by drying and cellulose can be transformed into granulose by treatment with NaOH.

534. **Schimper,** A. F. W. Untersuchungen über die Entstehung der Stärkekörner. (Botanische Zeitung, Leipzig, 1880, Jahrg. 38, p. 881–902; 1881, Jahrg. 39, p. 185–194, 201–211, 217–228.) **QEA**

Condensed in *Central-Blatt für Agrikulturchemie*, Biedermann's, Leipzig, 1881, Jahrg. 10, p. 195–197, 479–482.

Abstract in *Jour. chem. soc.*, 1881, v. 40, p. 1061.

535. **Naegeli,** Carl W. Das Wachsthum der Stärkekörner durch Intussusception. (Botanische Zeitung, Leipzig, 1881, Jahrg. 39, p. 633–651, 657–678.) **QEA**

Reply to recent criticism of Schimper. In defending the intussusception theory, assumes that the starch-grain is composed of very small invisible particles (micellae) which have a crystalline character and grow as crystals do, and which attract water to their surfaces. Further assumes that the differentiation of the substance into lamellae is present in all starch-grains, and that the homogeneous appearance of some grains is due to the optical appliances not being sufficiently powerful to perceive a lamellation which may be exceedingly indefinite and indistinct.

Abstract in *Biedermann's Centralblatt für Agrikulturchemie*, Leipzig, 1882, Jahrg. 11, p. 186–190.

Starches and Dextrins, continued.

Components of Starch Granule, continued.

536. Meyer, Arthur. Ueber die Structur der Stärkekörner. (Botanische Zeitung, Leipzig, 1881, Jahrg. 39, p. 841–846, 857–864.) **QEA**

The assumption that starch is a spherocrystal is regarded as the simplest explanation for the lamellation, the apposition-growth of these lamellae, the later deposition of the outer layers by external accretion, and the relatively low density of the inner parts of the older starch-grains.

Abstract in *Biedermann's Central-Blatt für Agrikulturchemie,* Leipzig, 1882, Jahrg. 11, p. 396–398.

537. Brukner, Bruno. Beiträge zur genauen Kenntnis der chemischen Beschaffenheit der Stärkekörner. (Monatshefte für Chemie, Wien, 1884, Bd. 4, p. 889–912.)

Available in the Library of Columbia University.

Concludes that swollen starch and starch paste differ in nothing but the aggregate condition of their micellae and that starch paste, amidulin and granulose are identical. Erythrogranulose, erythrodextrin and dextrin are also identical. The blue color of starch-I is due simply to a solution of I in the starch.

Abstract in *Jour. chem. soc.,* 1884, v. 46, p. 575–577; *Wag. Jahr.,* 1884, Jahrg. 30, p. 741; *Jahresber. Chem.,* 1883, p. 1365; *Chem. Centr.,* 1884, p. 247.

538. Vries, Hugo de. Sur la composition chimique des grains de fécule. (Recueil des travaux chimiques des Pays-Bas, Leide, 1885, tome 4, p. 187–188.) **PKA**

Starch grains are treated with dilute HCl over an extended period of time. The "starch cellulose" thus obtained is differentiated from ordinary cellulose by the I coloration. Concludes that starch is not composed of two individual carbohydrates.

Abstract in *Jahresber. Chem.,* 1885, p. 1806.

539. —— Stärkekörner. (Botanische Jahresberichte, Just's, Berlin, 1885, Jahrg. 13, Teil 1, p. 122.)

Available in Library of Columbia University.

Believes that only one carbohydrate is present in starch grains, and that it may exist in different degrees of density.

540. Sostegni, Livio. Sull' amido di riso. Sui rapporto fra esso e la quantità di desrosio formato nella conversione; alcune icerche sulla composizione della sua amidoellulosa, e sopra una materia grassa rinveuta in essa. (Gazzetta chimica italiana, Palermo, 1885, v. 15, p. 376–384.) **PKA**

The amount of dextrose obtained by sacharification of rice starch agrees with results of Salomon. Starch cellulose is prepared by treating starch with HCl and, after disappearance of the I reaction, filtering through asbestos. The residue contained 15–20% of an ether-soluble fat, which melted at 47–48°. The ether insoluble residue or starch cellulose differs from ordinary cellulose by its solubility in 2% KOH and its partial decomposition when warmed.

Abstract in *Jour. chem. soc.,* 1886, v. 50, p. 221; *Ber.,* 1885, Jahrg. 19, p. 103R; *Chem. Centr.,* 1887, p. 896; *Jahresber. Chem.,* 1885, p. 1756.

541. Meyer, Arthur. Ueber die wahre Natur der Stärke-Cellulose Nägeli's. (Botanische Zeitung, Leipzig, 1886, Jahrg. 44, p. 697–703, 713–719.) **QEA**

Abstract in *Jour. chem. soc.,* 1887, v. 52, p. 460; *Chem. Zentr.,* 1887, p. 6.

542. Griessmayer, Viktor. Ueber die wahre Natur der Stärkecellulose. (Auszug.) (Central-Blatt für Agrikulturchemie, Biedermann's, Leipzig, 1887, Jahrg. 16, p. 190–192.)

Available in Library of the Department of Agriculture.

Prepares the starch cellulose or skeleton-like substance described by Nägeli by subjecting potato starch to the action of 12% HCl for 100 days in the cold. From this preparation, after washing free of acid, sugar, etc., and drying, a quantity of starch cellulose was obtained. This substance was almost completely soluble in boiling water and by freezing such a solution amylodextrin crystallized out in the form of spherocrystals composed of minute radial needles.

543. Meyer, Arthur. Über die Struktur der Stärkekörner. (Pharmazeutische Zeitung, Berlin, 1887, Jahrg. 32, p. 332–333.)

Available in Library of Columbia College of Pharmacy.

Abstract in *Chem. Centr.,* 1887, p. 923; *Wag. Jahr.,* 1887, Jahrg. 33, p. 862.

544. Mikrosch, K. Der Bau der Stärkekörner. (Auszug.) (Jahres-Bericht über die Leistungen der chemischen Technologie, Wagner's, Leipzig, 1887, Jahrg. 33, p. 862–863.) **VOA**

545. Buscalioni, L. Sulla struttura dei granuli d'amido del mais. (Abstract.) (Botanische Jahresberichte, Just's, Berlin, 1891, Jahrg. 19, p. 489.)

Available in Library of Columbia University.

546. Eberdt, Oscar. Beiträge zur Entstehungsgeschichte der Stärke. (Jahrbücher für wissenschaftliche Botanik, Berlin, 1891, Bd. 22, p. 293–348.)

Available in Library of Columbia University.

Starches and Dextrins, continued.

Components of Starch Granule, continued.

547. Dodel, Arnold. Beitrag zur Morphologie und Entwickelungsgeschichte der Stärkekörner von Pellionia Daveauna. (Flora oder allgemeine botanische Zeitung, Marburg, 1892, Jahrg. 75, p. 266–280.)

Available in Library of Columbia University.

548. Duclaux, E. De la réaction de l'iode sur l'amidon. (Institut Pasteur, Annales, Paris, 1894, tome 8, p. 863–867.) **QDA**

Chiefly a discussion of the granulose and amylocellulose of Nägeli.

Abstract in *Chem. Centr.*, 1895, Bd. 1, p. 329.

549. Meyer, Arthur. Untersuchungen über die Stärkekörner. Wesen und Lebensgeschichte der Stärkekörner der höheren Pflanzen. Jena: Verlag von Gustav Fischer, 1895. 318 p. 4°. **VOD**

A noteworthy contribution to starch literature. Treats in detail the preparation and properties of α-amylose, β-amylose, amylodextrin, dextrin, isomaltose, maltose and diastase, the macrochemistry and microchemistry of starch granules, sphaerocrystals of starch granules and swelling of starch granules in hot water and in salt solutions. Discusses and criticizes the theory of granular structure as proposed by Nägeli, Bütschli and others. The latter half of the work is devoted to the biology of starch granules. Nine tables and bibliographical references are given.

550. Rothert, W. Einige Bemerkungen zu Arthur Meyer's "Untersuchungen über die Stärkekörner." (Deutsche botanische Gesellschaft, Berichte, Berlin, 1897, Jahrg. 15, p. 231.) **QEA**

Criticizes some of the conclusions of Meyer. Suggests the terms farinose and granulose for Meyer's α-amylose and β-amylose.

551. Salter, J. H. Zur näheren Kenntniss der Stärkekörner. (Jahrbücher für wissenschaftliche Botanik, Berlin, 1898, Bd. 32, p. 117–166.) **QEA**

552. Fischer, Hugo. Über Stärke und Inulin. (Beihefte zum Botanischen Centralblatt, Jena, 1902, Bd. 12, p. 226–242.)

Available in Library of Columbia University.

553. Kraemer, Henry. The structure of the starch grain. (Botanical gazette, Chicago, 1902, v. 34, p. 341–354.) **QEA**

554. Denniston, Rollin H. The structure of the starch grain. (Wisconsin Academy of Science, Arts and Letters, Transactions, Madison, 1904, v. 14, p. 527–533.) ***EA**

555. Fernbach, Auguste. Quelques observations sur la composition de l'amidon de pommes de terre. (Académie des sciences, Comptes rendus, Paris, 1904, tome 138, p. 428–430.) ***EO**

Light and heavy granules are separated by levigation and the phosphorus content shown to be higher in the lighter granules. Concludes that larger granules are formed by the superposing of phosphorus free starch on the smaller granules, which are relatively rich in phosphorus.

Abstract in *Jour. soc. chem. ind.*, 1904, v. 23, p. 330; *Jour. chem. soc.*, 1904, v. 86, part 1, p. 294; *Chem. Centr.*, 1904, Bd. 1, p. 819; *Jahresber. Chem.*, 1904, p. 1150.

556. Lindet, Léon. Action des solution aqueux de résorcine sur l'amidon. (Société chimique de Paris, Bulletin, 1906, série 3, tome 35, p. 101.) **PKA**

Resorcinol has the effect of swelling starch in the same manner as hot water or alkalis. This fact has been utilized for dissolving amylocellulose, prepared by the method of Maquenne and Roux. The rotatory power of the amylocellulose is about $\alpha_D = 195°$; it may be recovered unchanged by dialysis.

557. Malfitano, G. Les matières amylacées étudiées à l'aide de nos connaissances sur l'état colloïdal. (Académie des sciences, Comptes rendus, Paris, 1906, tome 143, p. 400–403.) ***EO**

Regards a clear starch solution as a colloidal solution in which the granules are formed of starch molecules grouped around a phosphate ion.

Abstract in *Jour. chem. soc.*, 1906, v. 90, part 1, p. 804; *Bull. assoc. chimistes*, 1906–07, tome 24, p. 575.

558. Maquenne, Léon, and Eugène Roux. Sur quelques nouvelles propriétés de l'extrait de malt. (Académie des sciences, Comptes rendus, Paris, 1906, tome 142, p. 1387–1392.) ***EO**

The activity of malt extract, when prepared quickly, increases upon standing. The amylopectin appears to be attacked only by a diastase which is developed during this "auto-excitation." The residual dextrins of saccharification appear to be derived from the amylopectin.

Abstract in *Jour. chem. soc.*, 1906, v. 90, part 2, p. 623; *Chem. Centr.*, 1906, Bd. 2, p. 261.

559. Wolff, Jules. Sur la détermination des amylocelluloses (amyloses insolubles) dans les amidons naturels. (Annales de chimie analytique, Paris, 1906, tome 11, p. 166–167.) **PKA**

Starches and Dextrins, continued.

Components of Starch Granule, continued.

Method based on observation of Roux that even the most resistant forms of amylocellulose are soluble in water at 145° and that all the amylaceous material is saccharified if the paste is cooled to 65° and immediately treated with malt extract.

Reprinted in *Bull. assoc. chimistes,* 1906–07, tome 24, p. 210–211.

Abstract in *Jour. soc. chem. ind.,* 1906, v. 25, p. 716; *Jour. chem. soc.,* 1906, v. 90, part 2, p. 500; *Chem. Centr.,* 1906, Bd. 2, p. 168.

560. **Bloemendal,** W. H. Beitrag zur Kenntnis des Stärkemehls. (Auszug.) (Chemisches Zentralblatt, Berlin, 1907, Bd. 1, p. 176.) **PKA**

Has studied specific gravity, elementary composition and heat of combustion of various starches. The nature of the starch components is also investigated. Concludes that α and β-amylose differ only in water content. Amylodextrin is not present in natural starch.

Printed in further detail in *Bull. assoc. chimistes,* 1907–08, tome 25, p. 809–812, 860–861.

Also abstracted in *Chem. abst.,* 1909, v. 3, p. 1102.

561. **Denniston,** Rollin H. The growth and organization of the starch grain. (Wisconsin Academy of Science, Arts and Letters, Transactions, Madison, 1907, v. 15, p. 664–708.) ***EA**

562. **Fouard,** Eugène. Recherches sur les propriétés colloïdales de l'amidon, et sur le mécanisme de migration de l'amidon dans les végétaux. (Institut Pasteur, Annales, Paris, 1907, tome 21, p. 475–484.) **QAA**

Evidence that phosphoric acid exists as such in the starch grains.

Also in *Bull. assoc. chimistes,* 1906–07, tome 24, p. 1207–1210.

Abstract in *Chem. abst.,* 1907, v. 1, p. 1781, 2312.

563. **Jentys,** E. Sur la nature chimique et la structure de l'amidon. (Académie des sciences de Cracovie, Bulletin internationale, Classe des sciences mathématiques et naturelles, 1907, p. 203–252.) ***QPA**

Starch grains consist of a mixture of colloids composed of reducing sugars and aromatic substances related to the tannins and glucosidic in nature. The structure of starch grains and the hydrolysis of starch are explained in these terms.

Abstract in *Chem. abst.,* 1907, v. 1, p. 2313; *Jour. chem. soc.,* 1907, v. 92, part 1, p. 589; *Chem. Zentr.,* 1907, Bd. 2, p. 687.

564. **Laer,** Henri van. La saccharification diastasique de l'amidon. (Société chimique de Belgique, Bulletin, Gand, 1907, tome 21, p. 8–20.) **PKA**

In a critical review, the author accepts the existence of amylose and amylopectin as individual constituents and interprets work of past investigators in the light of this recently proven heterogeneity of the starch granule.

Abstract in *Jour. soc. chem. ind.,* 1907, v. 26, p. 161; *Chem. abst.,* 1907, v. 1, p. 891; *Chem. Centr.,* 1907, Bd. 1, p. 946; *Bull. assoc. chimistes,* 1907–08, tome 25, p. 704–707.

565. **Fouard,** Eugène. Sur les propriétés colloïdales de l'amidon et sur l'existence d'une solution parfaite de cette substance. (Académie des sciences, Comptes rendus, Paris, 1908, tome 146, p. 285–287.) ***EO**

A 5% pseudo-solution of starch is filtered through a collodion membrane; the filtered, transparent liquid contains 2.74% starch, does not polarize light, is not acted on by an electric current and the fluidity is slightly less than that of water. Although relatively unstable this liquid constitutes a perfect solution. Concludes that the ordinary colloidal starch solution contains dissolved molecules along with starch in all degrees of molecular condensation.

Condensed in *Bull. assoc. chimistes,* 1907–08, tome 25, p. 861–862.

Abstract in *Jour. chem. soc.,* 1908, v. 94, part 1, p. 138; *Chem. abst.,* 1908, v. 2, p. 1380; *Jour. soc. chem. ind.,* 1908, v. 27, p. 238; *Chem. Zentr.,* 1908, Bd. 1, p. 1264.

566. **Gatin-Gruzewska,** Z. Sur la composition du grain d'amidon. (Académie des sciences, Comptes rendus, Paris, 1908, tome 146, p. 540–542.) ***EO**

A 3% paste of potato starch is treated successively with hot alkali and 95% alcohol, the resulting precipitate of amylopectin is neutralized and purified by dialysis or decantation. Amylose may be separated from the mother liquor. A second method of separation depends on fact that when starch grains are treated with dilute alkali the amylopectin swells and bursts and the amylose diffuses out. The two substances are described.

Reprinted in *Société de biologie, Comptes rendus,* Paris, 1908, Bd. 64, p. 178–180, *QAA.*

Abstract in *Chem. abst.,* 1908, v. 2, p. 1631; *Jour. soc. chem. ind.,* 1908, v. 27, p. 415; *Bull. soc. chim. Paris,* 1908, série 4, tome 3, p. 1007.

567. **Fouard,** Eugène. Sur les propriétés de l'amidon en rapport avec sa forme colloïdal. (Académie des sciences, Comptes rendus, Paris, 1908, tome 146, p. 978–981.) ***EO**

The earlier mentioned "perfect solution" shows a depression of the freezing point less than .001°. Solutions prepared by filtration through various membranes show differing properties indicating the heterogeneity of the dissolved molecules. The electrical conductivity of these solutions increases when the starch, upon standing, undergoes polymerization to a granular state.

Starches and Dextrins, continued.

Components of Starch Granule, continued.

Reprinted in detail in *Bull. soc. chim. France,* 1908, série 4, tome 3, p. 836–840; *Bull. assoc. chimistes,* 1908–09, tome 26, p. 730–733.

Condensed in *Bull. assoc. chimistes,* 1907–08, tome 25, p. 1098–1100.

Abstract in *Jour. chem. soc.,* 1908, v. 94, part 1, p. 503; *Chem. abst.,* 1908, v. 2, p. 2330; *Jour. soc. chem. ind.,* 1908, v. 27, p. 635; *Chem. Zentr.,* 1908, Bd. 2, p. 1098.

568. —— Sur les propriétés colloïdales de l'amidon et sur l'unité de sa constitution. (Société chimique de France, Bulletin, Paris, 1908, tome 3, p. 1170–1174.) **PKA**

A 5% pseudo-solution of starch was filtered through a series of collodion membranes. The residue was partly dissolved in warm water and the process repeated. From the data obtained concludes that starch is a single chemical species capable of a physical transformation, total and reversible, toward a state of perfect solution.

Reprinted in *Bull. assoc. chimistes,* 1908–09, tome 26, p. 733–736.

Abstract in *Chem. abst.,* 1909, v. 3, p. 1146.

569. —— Sur les propriétés colloïdales de l'amidon et sur l'unité de sa constitution. (Académie des sciences, Comptes rendus, Paris, 1908, tome 147, p. 813–816.) *** EO**

Abstract in *Jour. chem. soc.,* 1908, v. 94, part 1, p. 953; *Bull. soc. chim. Paris,* 1908, tome 3, p. 1170; *Chem. Zentr.,* 1908, Bd. 2, p. 2000.

570. Maquenne, Léon. Sur les propriétés de l'amidon pur. (Académie des sciences, Comptes rendus, Paris, 1908, tome 146, p. 317–318.) *** EO**

The "perfect solution" of Fouard is identical with a solution of amylose, previously described.

Abstract in *Jour. soc. chem. ind.,* 1908, v. 27, p. 291; *Jour. chem. soc.,* 1908, v. 94, part 1, p. 249; *Chem. abst.,* 1908, v. 2, p. 1522; *Chem. Zentr.,* 1908, Bd. 1, p. 1264; *Bull. assoc. chimistes,* 1907–08, tome 25, p. 862.

571. —— Observations sur la note de Mme. Gatin-Gruzewska. (Académie des sciences, Comptes rendus, Paris, 1908, tome 146, p. 542–545.) *** EO**

Amylose gives a pure blue color with iodine, and amylopectin a violet color; these substances are probably related, and intermediate substances may exist. Starch paste which has not been superheated is not a true colloid, but contains amylose in a state of true solution, together with particles of the grain envelope (amylopectin). Amylopectin can also be separated from amylose by boiling with salt solutions.

Abstract in *Jour. soc. chem. ind.,* 1908, v. 27, p. 415; *Chem. Zentr.,* 1908, Bd. 1, p. 1534.

572. Francis, C. K. Limitations of starch as an accelerator. (Journal of industrial and engineering chemistry, Easton, 1909, v. 1, p. 678–679.) **† VOA**

For 6 varieties of starch the P_2O_5 content ranges from 0.032% to 0.169%.

573. Gatin-Gruzewska, Z. Marche de l'oxydation et de l'hydrolyse de l'amidon et de ses constituants sous l'action du peroxyde d'hydrogène. (Académie des sciences, Comptes rendus, Paris, 1909, tome 148, p. 578–580.) *** EO**

Amylopectin is hydrolyzed by hydrogen peroxide, the products undergoing oxidation; during the hydrolysis of amylose "reversion amylose" is formed. Although there is a difference in the two transformations, dextrins are intermediate products in both cases. Starch behaves as a mixture of the two.

Abstract in *Jour. soc. chem. ind.,* 1909, v. 28, p. 376; *Jour. chem. soc.,* 1909, v. 96, part 1, p. 209; *Chem. abst.,* 1909, v. 3, p. 1410; *Chem. Zentr.,* 1909, Bd. 1, p. 1231.

574. Bottazzi, F., and C. Victorow. Sulle proprietà colloidali, e particolarmente sul transporto elettrico dell' amido. (Reale accademia dei Lincei, Atti, Roma, 1910, serie 5, v. 19, semestre 2, p. 7–14.) *** ER**

An alkaline solution of starch is dialyzed; when the solution reaches neutrality the amylopectin separates and may be further precipitated by addition of acid. Solutions of amylose show no electrical migration while, in neutral solutions, amylopectin is transported to the anode. The two substances may also be separated by ultrafiltration through hardened gelatin.

Abstract in *Chem. abst.,* 1911, v. 5, p. 1406; *Jour. chem. soc.,* 1910, v. 98, part 1, p. 655; *Jour. soc. chem. ind.,* 1910, v. 29, p. 1323; *Bull. soc. chim.,* 1911, tome 10, p. 883; *Chem. Zentr.,* 1910, Bd. 2, p. 969; *Jahresber. Chem.,* 1910, Bd. 2, p. 408.

575. Gatin-Gruzewska, Z. Quelques propriétés caractéristiques de l'amylose et de l'amylopectine. (Académie des sciences, Comptes rendus, Paris, 1911, tome 152, p. 785–788.) *** EO**

Starch paste is heated in an autoclave at 150° and, from the portion which dissolves, amylopectin is precipitated upon standing in the cold. The residue obtained by dialysis of an amylopectin solution is insoluble in nitric and sulphuric acids, not changed by alkalies, not colored by iodine but is soluble in HCl.

Abstract in *Chem. Zentr.,* 1911, Bd. 1, p. 1349.

576. Matthews, Charles G., and Frank E Lott. Recent researches on starch, and a brief retrospect. (Institutes of Brewing, Journal, London, 1911, v. 17, p. 219–270.) **VTRA**

The amylopectin theory is favored.

Abstract in *Bull. assoc. chimistes,* 1911–12, tome 29, p. 240–241.

577. Beijerinck, Martinus W. Structure of the starch-grain. (Koninklijke Akademie

Starches and Dextrins, continued.

Components of Starch Granule, continued.

van Wetenschappen, Proceedings, Amsterdam, 1912, v. 14, p. 1107–1110.) *EL

578. Duryea, Chester B. Some special aspects of starch. (International Congress of Applied Chemistry, 8th, Washington and New York, 1912, Original communications, v. 13, p. 125–129.) **PKR**

Discusses various kinds of normal starches, structure of starch granules and synthesis of starch. Does not favor the amylopectin theory.

579. Gatin-Gruzewska, Z. Contribution à l'étude de l'amidon. 1. L'amylose et l'amylopectine. La séparation des deux constituants du grain d'amidon et leurs principaux caractères. (Journal de physiologie et de pathologie générale, Paris, 1912, tome 14, p. 7–18.)

Available in Library of the New York Academy of Medicine.

Abstract in *Chem. abst.*, 1913, v. 7, p. 89.

580. Meyer, Arthur. Beiträge zur Kenntnis der Gallerten, besonders der Stärkegallerten. (Kolloidchemische Beihefte, Dresden and Leipzig, 1913–14, Bd. 5, p. 1–48.) **PKA**

A thorough study of changes occurring when arrowroot starches are "dissolved" at 138–140° and the solutions cooled. The individual behavior of the α- and β-amyloses is closely observed.

Abstract in *Jour. chem. soc.*, 1913, v. 104, part 2, p. 848; *Chem. abst.*, 1914, v. 8, p. 1225; *Chem. Zentr.*, 1913, Bd. 2, p. 1643.

581. Samec, Max, and F. von Hoefft. Studien über Pflanzenkolloide. 3. Entaschungs- und Lösungsvorgänge bei Stärke. (Kolloidchemische Beihefte, Dresden and Leipzig, 1913–14, Bd. 5, p. 141–210.) **PKA**

Previous work is cited, showing demineralization and solution of starch and the aging of starch solutions is accompanied by a decrease in viscosity, a decrease in influence of acids and bases on viscosity and an increase in electrical conductivity. Correlate work of a number of experimenters by assuming the presence of "amylophosphoric acid." Include 24 tables, 31 diagrams.

Abstract in *Jour. soc. chem. ind.*, 1913, v. 32, p. 954; *Chem. abst.*, 1914, v. 8, p. 837, 1602; *Jour. chem. soc.*, 1913, v. 104, part 1, p. 1155; *Chem. Zentr.*, 1914, Bd. 1, p. 37–39; *Bull. assoc. chimistes*, 1913–14, tome 31, p. 536–538.

582. Thomas, Arthur W. The phosphorus content of starch. (Biochemical bulletin, New York, 1913–14, v. 3, p. 403–406.) **PPB**

Potato starch was thoroughly washed with water, dried between filter papers, treated with 7% HCl, rewashed with distilled water and dried in an oven, the entire operation extending over a period of 2 months. The purified product contains 0.0168% P and gives a true colloidal dispersion in water which is not precipitable by alcohol. As the P appears to be in organic combination the estimated molecular weight of starch is therefore about 200,000.

583. Harvey, R. B. The structure and diagnostic value of the starch grain. (Abstract.) (Chemical abstracts, Easton, 1914, v. 8, p. 2454.) **PKA**

The various layers of the grain are differentiated by treating with reducible silver solutions.

584. Samec, Max. Studien über Pflanzenkolloide. 4. Die Verschiebungen des Phosphorgehaltes bei den Zustandsänderungen und dem diastatischen Abbau der Stärke. (Kolloidchemische Beihefte, Dresden and Leipzig, 1914, Bd. 6, p. 23–54.) **PKA**

Starch is treated with 0.125N KOH for 1 hour, the solution made slightly acid, diluted and, after standing, the liquid siphoned off, the residual amylopectin drastically washed with water and the wash liquors and amylopectin mixture separately dialyzed for 2 months. The amylose and amylopectin contain, respectively, 0.007 and 0.185% P. The same separation may be effected by grinding with sand or heating with water. Shows by electrical conductivity and viscosity measurements that the action of amylase does not break down the P compound of starch.

Abstract in *Chem. abst.*, 1915, v. 9, p. 468; *Jour. chem. soc.*, 1914, v. 106, part 1, p. 930; *Jour. soc. chem. ind.*, 1914, v. 33, p. 760; *Chem. Zentr.*, 1914, Bd. 2, p. 719.

585. Tanret, Charles. Sur la pluralité des amidons. (Académie des sciences, Comptes rendus, Paris, 1914, tome 158, p. 1353–1356.) *EO

Starch (0.2 gr.) is extracted with 3 successive portions of hot water, the solution decanted and the residue dried and weighed. For 15 starches investigated, this residue ranged from 67–80%. The amylopectin of potato starch, however, is readily soluble in boiling water. Amylose may be quantitatively separated from starch solutions by fixation on cotton or filter paper.

Abstract in *Chem. abst.*, 1914, v. 8, p. 2964; *Chem. Zentr.*, 1914, Bd. 2, p. 51.

Reprinted with *entry 586* in further detail in *Bull. soc. chim. Paris*, 1915, série 4, tome 17, p. 83–97. Abstract in *Chem. abst.*, 1915, v. 9, p. 1912; *Chem. Zentr.*, 1915, Bd. 2, p. 73.

586. —— Sur la pluralité des amyloses. (Académie des sciences, Comptes rendus, Paris, 1914, tome 159, p. 530–532.) *EO

The quantities of amylose dissolved from 16 different starches at different tempera-

Starches and Dextrins, continued.

Components of Starch Granule, continued.

tures were compared colorimetrically by iodine. As the solubility curves were neither regular nor similar in form, concludes there exists a variety of soluble starches corresponding to each species.

Abstract in *Jour. soc. chem. ind.*, 1914, v. 33, p. 1068; *Chem. Zentr.*, 1915, Bd. 1, p. 1056.

Reprinted in further detail with *585* in *Bull. soc. chim. Paris*, 1915, tome 17, p. 83–97. Abstract in *Chem. Zentr.*, 1915, Bd. 2, p. 73; *Chem. abst.*, 1915, v. 9, p. 1912.

587. Northrop, John M., and John M. Nelson. The phosphoric acid in starch. (American Chemical Society, Journal, Easton, 1916, v. 38, p. 472–479.) **PKA**

The starch investigated contained .06% P and less than .1% N. Contrary to Samec, the P is removed by 10% HCl at 100°, only after prolonged hydrolysis. An organic phosphoric acid was obtained by hydrolyzing large quantities with HCl, neutralizing with $BaOH_2$, filtering, precipitating the Ba compound with alcohol, converting to the Pb salt, decomposing with H_2S, precipitating from the resulting filtrate by acetic acid and repeating the purification by means of the Pb salt. The resulting substance contained 5% P and yielded 65% glucose on acid hydrolysis.

Abstract in *Chem. abst.*, 1916, v. 10, p. 766; *Jour. chem. soc.*, 1916, v. 110, part 1, p. 373; *Chem. Zentr.*, 1916, Bd. 1, p. 943; *Bull. soc. chim. Paris*, 1916, série 4, tome 20, p. 525.

588. Samec, Max. Studien über Pflanzenkolloide. 6. Zur Kenntnis der Alkalistärke. (Kolloidchemische Beihefte, Dresden und Leipzig, 1916, Bd. 8, p. 33–62.) **PKA**

A study of changes occurring in natural and P free starches when treated with varying concentrations of alkali; measures variations in conductivity, viscosity, alcohol precipitability, specific rotation, and osmotic pressure. Concludes that upon increase in alkali concentration there follows successively the formation of a salt of amylophosphoric acid, formation of amylates, and finally peptization of the starch complex.

Abstract in *Chem. abst.*, 1917, v. 11, p. 312; *Jour. chem. soc.*, 1916, v. 110, part 1, p. 308; *Chem. Zentr.*, 1916, Bd. 1, p. 1016–1018.

589. Sherman, Henry C., and J. C. Baker. Starch as a substrate for enzyme action. (American Chemical Society, Journal, Easton, 1916, v. 38, p. 1885–1904.) **PKA**

Potato starch was gelatinized at 85° with .001 M NaCl and portions of the liquid centrifuged. Using the P content as a criterion of separation, it is found that the upper and lower layers consist respectively of 90% β-amylose and 90% α-amylose. The intensity of the blue iodine reaction, the retrogradation on standing and the effect on viscosity produced by acids and salts, serve to identify the two starch components. Study the action of both commercial and highly purified samples of pancreatin, A. oryzae and malt amylases on the 4 substrates, Lintner's soluble starch, α- and β-amylose and whole starch autoclaved. Results indicate that Lintner's soluble starch is suitable as a substrate for testing the activities of the different amylases. The 3 amylases show distinctly different ratios of amyloclastic and saccharogenic powers.

Abstract in *Chem. abst.*, 1916, v. 10, p. 2745; *Chem. Zentr.*, 1916, Bd. 2, p. 1124; *Bull. soc. chim. Paris*, 1917, série 4, tome 22, p. 132.

590. Biedermann, W. Stärke, Stärkekörner und Stärkelösungen. (Archiv für die gesamte Physiologie des Menschen und der Tiere, Pflüger's, Berlin, 1920, Bd. 183, p. 168–196.) **QCA**

Gives description of α and β amylose. The microscopic characteristics of starch under various types of treatment are shown, and the nature of the starches derived from different sources is discussed.

Abstract in *Chem. abst.*, 1921, v. 15, p. 2997; *Chem. Zentr.*, 1920, Bd. 3, p. 845.

591. Hess, Kurt. Über die Konstitution der Cellulose. Bemerkung zu einer Arbeit von Hrn. P. Karrer. (Helvetica chimica acta, Basileae et Genevae, 1920, v. 3, p. 866–869.) **PKA**

Includes discussion on the molecular grouping in the starch granule and on the structural unit "amyloxose."

Abstract in *Bull. soc. chim. France*, 1921, série 4, tome 30, p. 890.

592. Samec, Max, and H. Haerdtl. Studien über Pflanzenkolloide. 9. Zur Kenntnis verschiedener Stärkearten. (Kolloidchemische Beihefte, Dresden und Leipzig, 1920, Bd. 12, p. 281–300.) **PKA**

Compare viscosity, I reaction, molecular weight by osmotic pressure, electrical conductivity, P content and dialyzable fraction of several starches. Show that all starches consist of a highly viscous, electro-conducting fraction which precipitates on electrodialysis and a non-viscous, non-conducting fraction, which is not precipitated on electrodialysis. The amounts vary according to the origin of the starch, their relative proportion influencing the viscosity, resistance to amylase and water content of the particular variety. The conductivity does not bear a direct relation to the P content which varies from 0.01% to 0.16% P_2O_5.

Abstract in *Jour. chem. soc.*, 1921, v. 120, part 1, p. 226; *Chem. abst.*, 1920, v. 14, p. 2728; *Chem. Zentr.*, 1920, Bd. 3, p. 460.

593. Taylor, T. Clinton, and John M. Nelson. Fat associated with starch. (American Chemical Society, Journal, Easton, 1920, v. 42, p. 1726–1738.) **PKA**

Starches and Dextrins, continued.

Components of Starch Granule, continued.

Corn starch, previously freed from extraneous fat, was hydrolyzed by aqueous HCl and the liberation of 0.5 to 0.6% fat was noted. Destruction of the starch granule by gelatinization with alcoholic ammonium thiocyanate solution does not affect combined fat. From such fatty material, liberated by acid hydrolysis on a commercial scale, palmitic acid was isolated and identified; there was also present a non-acidic, highly unsaturated substance. Hydrolysis by 3M HCl to the erythrodextrin stage results in a liberation of 0.53% fat. Hydrolysis by amylase to the erythrodextrin stage liberates 0.2% fat, further hydrolysis to the achromic point resulting in a total liberation of 0.4% fat. Solutions of starch at a low pH deposit, on standing, substances containing 3.3 to 5.5% fat by hydrolysis. When decomposed by alcoholic HCl to approximately the erythrodextrin stage, starch retains its entire quota of fat. 5 other varieties of starch were shown to contain varying amounts of hydrolyzable fat.

Abstract in *Chem. Zentr.*, 1920, Bd. 3, p. 845; *Bull. soc. chim. France*, 1920, série 4, tome 28, p. 875.

594. Tryller, H. Beiträge zur Chemie der Kartoffelstärkefabrikation. (Chemiker-Zeitung, Cöthen, 1920, Jahrg. 44, p. 833–834, 845–847.) **†† VOA**

From a study of the ash content of potato starches, previously subjected to various treatments, concludes that starch is in the form of a K salt of starch phosphoric acid. During the washing process, K is replaced by the Ca of the wash water.

Abstract in *Chem. abst.*, 1921, v. 15, p. 1828; *Chem. Zentr.*, 1921, Bd. 2, p. 76.

595. Biedermann, W. Fermentstudien. 5. Fermentbildung durch Ionenwirkung. (Fermentforschung, Leipzig, 1921, Bd. 4, p. 1–28.) **PPH**

1. Amylose, Amylopektin und Amylozellulose. Amylose solutions are obtained by extracting wheat or pea starches with water at 80°, the residue being termed amylopectin. When these extracted residues are treated with filtered saliva a substance remains which resembles cellulose. 2. Der Einfluss von Salzen auf die autolytische Spaltung von reiner Amylose. Concludes that soluble amylose, under the influence of certain ions, yields a substance which acts as an autolytic enzyme.

Abstract in *Jour. soc. chem. ind.*, 1921, v. 40, p. 483A; *Chem. abst.*, 1921, v. 15, p. 1539; *Chem. Zentr.*, 1920, Bd. 3, p. 638.

596. Reychler, Albert. Notes sur la fécule. (Société chimique de France, Bulletin, Paris, 1921, tome 29, p. 311–316.) **PKA**

Studies behavior of grains under polarized light, gelatinization by inorganic salts, and coagulation and retrogradation of starch solutions. Concludes that starch is composed of amylose and amylopectin, which differ in their degrees of condensation.

Abstract in *Chem. abst.*, 1921, v. 15, p. 3225; *Chem. Zentr.*, 1921, Bd. 3, p. 1501.

597. Samec, Max, and Anka Mayer. Sur la substance organique fondamentale de l'amylopectine. (Académie des sciences, Comptes rendus, Paris, 1921, tome 172, p. 1079–1082.) *** EO**

A 2% starch solution was electrodialyzed, the solution of amylose decanted from the resulting deposit, the deposit mixed with water and the process repeated 7 or 8 times. The gelatinous product finally obtained contained 5–8% amylopectin and had a molecular weight by osmotic pressure of 140,000. The solution of amylose had a molecular weight of 70,000 and an $\alpha_D = 189^\circ$. The carbohydrate obtained upon the saponification of amylopectin was shown to differ, in some respects, from the amyloses of Maquenne. Propose a new system of nomenclature based on reducing power and iodine reaction.

Abstract in *Chem. Zentr.*, 1921, Bd. 3, p. 297; *Chem. abst.*, 1921, v. 15, p. 2456, 3629.

598. —— Sur la synthèse de l'amylopectine par éthérification phosphorique des érythroamyloses. (Académie des sciences, Comptes rendus, Paris, 1921, tome 173, p. 321–322.) *** EO**

By the method of Neuberg, they obtain a material which appears to be a calcium amylophosphate. The salt loses its cations upon electrodialysis and there is deposited on the membrane an extremely viscous jelly, which resembles amylopectin. Tabulate conductivity, viscosity, molecular weight, and P_2O_5 content of amylopectin, erythroamylose, and the synthetic erythroamylose phosphate.

Abstract in *Chem. abst.*, 1921, v. 15, p. 3983; *Chem. Zentr.*, 1921, Bd. 3, p. 1351; *Bull. soc. chim. France*, 1921, série 4, tome 30, p. 1334.

599. —— Studien über Pflanzenkolloide. XI. Elektrodesintegration von Stärkelösungen. (Kolloidchemische Beihefte, Dresden and Leipzig, 1921, Bd. 13, p. 272–288.) **PKA**

Starch solutions are separated by electrodialysis into the "amyloamyloses" and "erythroamyloses." The first correspond to the amylose of Maquenne, are electrically neutral, give a blue iodine coloration, molecular weight about 80,000, $\alpha_D = 189^\circ$, and make up about 17% of the total. The second, obtained by heating the amylopectin fraction under pressure, have a molecular weight of about 135,000, $\alpha_D = 195^\circ$, and give a red iodine coloration. Amylopectin in pure water becomes sufficiently acid to effect its

Starches and Dextrins, continued.

Components of Starch Granule, continued.

own disaggregation to dialyzable substances.

Abstract in *Jour. chem. soc.*, 1921, v. 120, part 1, p. 707; *Chem. abst.*, 1922, v. 16, p. 1893.

600. **Zwikker,** J. J. L. Contribution à la connaissance de la fécule. (Recueil des travaux chimiques des Pays-Bas, Leyde, 1921, tome 40, p. 605–615.) **PKA**

An examination of the colloidal nature of constituents of 4 starches. Solutions prepared in the cold by mechanical destruction of the granule and solutions prepared by heating, have been subjected to ultrafiltration. Investigates relation of viscosity to amylophosphoric acid present and relation of the attached cations to adsorption properties of the starches.

Abstract in *Chem. abst.*, 1922, v. 16, p. 1026–1027; *Chem. Zentr.*, 1922, Bd. 3, p. 835; *Bull. soc. chim. France*, 1922, série 4, tome 32, p. 463.

601. **Malfitano,** G., and M. Catoire. L'amylocellulose considérée comme composé d'acide silicique et d'amylose. (Académie des sciences, Comptes rendus, Paris, 1922, tome 174, p. 1128–1130.) *** EO**

Both potato and corn starches, when carefully prepared so as to insure the absence of sand, cellular membranes or other impurities, yield ash containing SiO_2. The so-called amylocellulose may be a compound of the composition $[SiO_8(C_6H_{10}O_5)n]H_2$. — *Chem. abst.*

Abstract in *Chem. Zentr.*, 1922, Bd. 3, p. 717; *Bull. soc. chim. France*, 1922, série 4, tome 32, p. 1400.

602. **Pringsheim,** Hans, and Kurt Goldstein. Die Beziehung der alpha und beta Polyamylosen zur Inhalts und Hüllsubstanz des Stärkekorns. (Beiträge zur Chemie des Stärke, 7.) (Deutsche chemische Gesellschaft, Berichte, Berlin, 1922, Jahrg. 55, p. 1446–1449.) **PKA**

By a comparison of iodine colorations, specific rotations, ratio of molecular weights, and affinities for iodine, the erythroamyloses (1) and amyloamyloses (2) of Samec are shown to bear a close relationship to the β and α polyamyloses, respectively. Separate fermentations with B. macerans of (1) and (2) furnish a higher yield of β polyamyloses from (1) and a higher yield of α polyamyloses from (2). A similarity between glycogen and the erythroamyloses is pointed out.

Abstract in *Chem. abst.*, 1922, v. 16, p. 3876; *Jour. chem. soc.*, 1922, v. 122, part 1, p. 633; *Chem. Zentr.*, 1922, Bd. 3, p. 761; *Bull. soc. chim. France*, 1922, série 4, tome 1561.

603. **Samec,** Max, and Anka Mayer. Studien über Pflanzenkolloide. 13. Über synthetische Amylophosphorsäuren. (Kolloidchemische Beihefte, Dresden und Leipzig, 1922, Bd. 16, p. 89–98.) **PKA**

By method of Neuberg prepare phosphoric esters of the erythroamyloses, which contain 2.2% P_2O_5 and closely resemble amylopectin in properties; the amyloamyloses, upon similar esterification, also yield gelatinous substances. The iodine colorations of these phosphoric esters are the same as those of the initial substances.

Abstract in *Chem. abst.*, 1923, v. 17, p. 270; *Jour. chem. soc.*, 1922, v. 122, part 1, p. 921; *Chem. Zentr.*, 1923, Bd. 1, p. 46.

604. **Aoi,** Ren-Ichiro. On the fat in the starch granules of rice. [Title translated.] (Nippon Kwagaku Kwai Shi [Chemical Society of Tokyo], Journal, 1923, v. 44, no. 7, p. 755–763.)

Available in Library of the Department of Agriculture.

The fat content of samples of rice starch produced in Japan and in China was determined by a modification of the method of Taylor and Nelson. Three samples of Japanese rice starch contained 0.55–0.56% of associated fat and 0.54–0.61% of extraneous fat. The sample of Chinese rice starch examined contained 0.66% of associated fat and 0.38% of extraneous fat. The extraneous fat was removed by extracting with ether for 90 hours, the method of Taylor and Nelson proving ineffective. — *Jour. soc. chem. ind.*

605. **Clayson,** D. H. F., and S. B. Schryver. The hemi celluloses. I. The hemicellulose of wheat flour. (Biochemical journal, Cambridge, 1923, v. 17, p. 493–496.) **PPB**

Gliadin is removed from the sample by extraction with 70% alcohol, starch by digestion with taka-diastase and glutenin by digestion with 0.1% NaOH. From the remaining material, hemicellulose is extracted with a cold 4% solution of NaOH and reprecipitated upon neutralization with acetic acid. The product is similar in all respects to the hemicelluloses obtained from starch (*see entry 608*).

Abstract in *Chem. abst.*, 1924, v. 18, p. 402; *Chem. Zentr.*, 1923, Bd. 3, p. 1622.

(To be continued)

INTERESTING RECENT ADDITIONS

Industries and Industrial Arts

* **All** the world's aircraft, founded by Fred T. Jane, compiled and edited by C. G. Gray and Leonard Bridgman. 16th year. London: Sampson Low, Marston and Company, Ltd., 1926. variously paged. 4°. 42s. **VDS (121)**

Copiously illustrated quarto volume now in its 16th year gives resumé of recent aeronautical progress and other data for each of the nations; with descriptions and pictures of the world's aeroplanes, aero engines, and airships. Noteworthy book of reference.

Anderson, Romola, and R. C. Anderson. The sailing ship. Six thousand years of history. London: George G. Harrap and Company, Ltd., 1926. 212 p. illus. 8°. 10s.6d. **VXH (121)**

"Six thousand years of history is a big span to encompass in a volume of about 200 pages, and the authors get over it by disposing of 4,000 years in the first chapter, leaving 2,000 years for the rest of the book, later developments, naturally, being treated at some length. There are some excellent illustrations of all types of vessels, and the book presents a very interesting sketch of the development of the sailing ship, taking us right up to the American six-masted schooner and the peculiar five-masted rig of some modern German vessels." — *Shipbuilding and shipping record, Oct. 28, 1926.*

Barman, Christian. The bridge, a chapter in the history of building, illustrated in colour and black and white by Frank Brangwyn... New York: Dodd, Mead and Company, 1926. xvii, 249 p. illus. 4°. $10.00. **VEK (121)**

Scholarly and delightfully written discussion of the relation of conditions and materials to bridge form, embellished by noteworthy illustrations of picturesque old structures.

Bernewitz, M. W. von. Handbook for prospectors. New York: McGraw-Hill Book Company, Inc., 1926. ix, 319 p. illus. 12°. $3.00. **VHB (117)**

A wealth of concise information on equipment, transportation, laws, first aid, mineralogy and geology, how to prospect, sampling and field tests, development of a prospect, markets and prices, with an excellent glossary of terms used in mining.

"That he has prepared a book of over 300 pages for prospectors is evidence of his faith in the existence of the tribe. But he intends it for the student and mine official also. He has the scientific prospector in mind." — *A. H. Hubbell in Engineering and mining journal.*

* **Blunt,** H. S. Gum arabic with special reference to its production in the Sudan. New York: Oxford University Press, American Branch, 1926. 47 p. illus. 4°. 10s.6d. **VOV (119)**

Author spent five years in one of the main gum-producing districts of the southern Sudan. Deals with botany, trade history, marketing, transportation, royalties, chemical properties and uses, origin, and forest policy. Interesting plate illustrations.

* **Born,** Max. Problems of atomic dynamics. Two series of lectures on: I, The structure of the atom (20 lectures); II, The lattice theory of rigid bodies. Cambridge, Mass.: Massachusetts Institute of Technology, 1926. xiv, 200 p. diagrs. 8°. $3.50. **PAW (117)**

Lectures by the Professor of Physics of the University of Göttingen, before the students of the Massachusetts Institute of Technology. For review of the German edition see *Journal of the Royal Microscopical Society*, Sept., 1926.

"They do not purport to be a text-book — for of these we have enough — but rather an exposition of the present status of research in those regions of physics in which I myself have made investigations, and of which I therefore believe that I can take a comprehensive view... It was my purpose to present methods, objects of investigation, and the most important results." — *Preface.*

Brockman, C. J. Electro-organic chemistry. New York: John Wiley and Sons, Inc., 1926. xi, 381 p. illus. 8°. $5.00. **PPR (119)**

"The study of the electrolysis of organic compounds is not entirely new. Many years ago some experiments were made with familiar organic salts, but these were limited in scope and attracted but little attention. It needed the invention of convenient methods of producing currents of definite strength and methods of accurate measurement to raise the investigation to a satisfactory basis. Such requirements have only recently been attainable, and hence the data given in the book in hand cover a comparatively new field. The author has searched the literature and produced a work that presents a comprehensive and clear summary of the nature and effects of the application of electrolytic methods to many types of organic compounds." — *Henry Leffman in Journal of the Franklin Institute, Dec., 1926.*

Darrow, Karl K. Introduction to contemporary physics. New York: D. Van Nostrand Company, 1926. xxvi, 453 p. illus. 8°. $6.00. **PAT (117)**

Recasting and enlargement of a series of articles published in the *Bell System technical journal,* being a unified account of the phenomena which the atom-model of Rutherford and Bohr is designed to interpret. Author is a member of the technical staff of the Bell Telephone Laboratories, Inc.

* **Deguent,** R. Inondations. Bruxelles: The author, 1926. 177 p. and atlas. 4°.

The author, a major in the Belgian Corps of Engineers, tells in detail the methods by which a region may be flooded to prevent invasion by the enemy. He first deals with the inundations of the Belgian front in 1914–1918, and then works out a scheme for flooding the Senne valley above Hombeek. Copiously illustrated with maps and diagrams.

An excellent review in *The Royal Engineers journal,* Dec., 1926.

* **Friend,** J. Newton, editor. A text-book of inorganic chemistry. Volume VII, part III: Chromium and its congeners, by Reece H. Vallance and Arthur A. Eldridge. London: Charles Griffin and Company, 1926. xxvi, 380 p. 8°. 18s. **PNB (119)**

Treats of the occurrence, history, preparation, properties, and inorganic compounds of chromium, molybdenum, tungsten, and uranium, with numerous footnote references.

Industries and Industrial Arts, continued.

Gaydon, Harry A. The art and science of the gramaphone. London: Dunlop and Company, 1926. 172 p. illus. 12°. 3s. **PFG (117)**

Explains all of the parts in detail and tells how to get the best from the machine.

* **Haddock,** M. H. The location of mineral fields. Modern procedure in the investigation of mineral areas and the subsequent verification of their extent. London: Crosby Lockwood and Sons, 1926. vii, 295 p. illus. 12°. 9s. 6d. **VHB (117)**

Contents: The application of planes in mining. Contouring. Form of outcrop and mineral mapping practice. Borehole surveys and problems. Faulting and folding. Applied geophysics. Spherical trigonometry and astronomical methods. Triangulation. Correlation.

"The mathematical basis and theory behind many of the methods used in surveying, mapping, and prospecting is emphasized throughout the text, but not to the subordination of practical details. Although much of the material covered may be found in other texts on engineering topics, the book is unique and useful in providing these data in one handy volume." — *F. E. Wormser in Engineering and mining journal, Nov. 13, 1926.*

* **Hottenroth,** Valentin. Die Kunstseide. Leipzig: S. Hirzel, 1926. xii, 492 p. illus. 8°. Paper, 26 mks.; bound, 28 mks. **VLNE (121)**

A concise review of various processes, covering manufacture, spinning, dyeing, and properties, with numerous references to patent literature.

Humphreys, W. J. Rain making and other weather vagaries. Baltimore: The Williams and Wilkins Company, 1926. x, 157 p. 12°. $2.50. **PRO (117)**

"An interestingly written little book exposing many popular weather superstitions, by one of America's foremost weather authorities." — *Science news-letter, Nov. 6, 1926.*

* **Jeans,** J. H. The mathematical theory of electricity and magnetism. Cambridge, England: The University Press; New York: The Macmillan Company, 1925. vii, 652 p. diagrs. 5. ed. 8°. 21s. **PGG (121)**

"The previous edition was marked by the introduction of a new chapter on the theory of relativity. The present has yet another new chapter on 'The electrical structure of matter,' intended as an introduction to the quantum theory. It seems rather sad that this new chapter should have to confess that some of the conclusions in the earlier part of the book — as to the radiation of energy from an accelerated electron — are in contradiction with modern knowledge, and that the whole theory which led to those conclusions is in need of amendment; but such is the history of science. The chapter will admirably serve its purpose of leading up to modern theory." — *Nature, Jan. 2, 1926.*

Johnson, W. H. Cotton and its production, with an introduction by Sir Wyndham Dunstan, and a foreword by Sir William Himbury. London and New York: The Macmillan Company, 1926. xxvii, 536 p. maps. 8°. 30s. **VLLD (121)**

Historical outline of the industry as a whole, and of plant botany, is followed by chapters dealing with conditions in the various cotton raising countries of the world; methods of cultivation; handling and marketing the crop; cotton from the manufacturer's standpoint; the improvement of cotton; diseases and insect pests; and cotton by-products. 26 maps.

"The author has evidently utilised his very extensive experience of cotton-growing in most parts of the world to guide him in compiling this substantial volume of documentary sources. The result is a useful addition to the books about cotton, for besides being well up-to-date it is well balanced and exceptionally free from errors of fact." — *Nature, Nov. 27, 1926.*

Lee, Willis T. Stories in stone, telling of some of the wonderlands of western America and some of the curious incidents in the history of geology. New York: D. Van Nostrand Company, 1926. xii, 226 p. 8°. $3.00. **PVB (117)**

Historical geology presented in unconventional and interesting form by one long associated with the United States Geological Survey. Chapters on observations by aircraft, legends of creation, and how the earth was made. Excellent description and discussion of the Grand Canyon.

Mair, David Beveridge. Fourfold geometry, being the elementary geometry of the four-dimensional world. London: Methuen and Company, 1926. viii, 182 p. diagrs. 8°. 8s.6d. **OLY (117)**

"His aim is to prepare the ground for an understanding of relativity geometry rather than to treat his subject as a special case of general manifold geometry... From the first the notation is carefully explained and chosen to foreshadow and fit the tensor operations which thus emerge naturally and easily. The style is lucid and precise... A knowledge of Cartesian geometry is assumed, but very little more. The careful diagrams and well-thought-out exercises interspersed in the text, together with solutions at the end, add to the value of this stimulating little book." — *Nature, Sept. 11, 1926.*

* **Michenfelder,** C. Kran- und Transportanlagen für Hütten-, Hafen-, Werft- und Werkstatt-Betriebe. Berlin: Julius Springer, 1926. vi, 683 p. 2. rev. and enl. ed. illus. 4°. 67.50 mks. **VFG (121)**

First edition (532 pages) was published in 1912.

"Most of the installations described and illustrated are of German origin, but numerous typical examples of British, American, Dutch, and Italian plants are also fully dealt with, which renders the book a comprehensive treatise on the subjects... Written with an unbiased mind, the criticisms are just, and it should therefore prove a useful guide to engineers in charge of such works as come within the scope of the publication." — *Engineer, Nov. 19, 1926.*

Nernst, Walther. The new heat theorem, its foundations in theory and experiment, translated from the second German edition by Guy Barr, London: Methuen & Co., Ltd., 1926. xvi, 281 p. diagrs. 8°. 12s.6d. **PDN (117)**

"The exposition of the experimental side of the work is naturally a model of all that such an exposition should be; one expects no less from such a master of experimental method as Nernst. The mathematical presentation is unfortunately not so good; one finds, for example, the mathematical absurdity of a definite integral with no lower limit... Not the least interesting feature of the book is the occasional glimpse which is afforded of the interior of Nernst's mental laboratory... The translation of Dr. Barr is all that could be desired." — *Scientific worker, Oct., 1926.*

Industries and Industrial Arts, continued.

Park, Clyde W. English applied in technical writing. New York: F. S. Crofts and Company, 1926. xix, 313 p. 8°. $2.25. **VBA (121)**

Author is Professor of English in the University of Cincinnati.

"Shaped in accordance with what long experience has shown to be the needs of the average technical student. Where the necessary adaptation has seemed to call for exceptional arrangement or unconventional style, these have been freely used. Even very elementary information has been included at certain points where it seemed to be needed. The result is, not a formal treatise, but a book of counsel and instruction." — *Preface.*

Polk, Ralph W. The practice of printing. Peoria, Illinois: The Manual Arts Press, 1926. xiv, 296 p. illus. 12°. $1.80. *** IPR (Stack)**

Traces the history of aviation, tells how the aero-elements of good composition, typographic display, presswork, inks, paper, plates, and linoleum block printing, with a glossary of terms and an appendix on school equipment. Written in clear, simple style and fully illustrated. Author is Principal of the Robidoux Polytechnic School, St. Joseph, Missouri.

Porter, C. W. The carbon compounds, a textbook of organic chemistry. Boston: Ginn and Company, 1926. vii, 501 p. rev. ed. 8°. $4.00. **POB (119)**

Practically a reprint of the 1924 edition with new questions and problems. Elementary course limited to fundamental principles and general reactions. Author is Associate Professor of Chemistry in the University of California.

Pritchard, J. Laurence. The book of the aeroplane. London and New York: Longmans, Green and Company, 1926. vii, 255 p. illus. 8°. $2.75. **VDY (121)**

Traces the history of aviation, tells how the aeroplane is constructed and how it flies, of the air routes of the world, and the complex organization of the modern aerodrome. Famous flights are described; and accounts are given of the engine, special types of aeroplanes, flying boats, the ambulance plane, the troop carrier, the passenger plane, and the autogiro.

* **Rigge,** William F. Harmonic curves. Omaha: The Creighton University, 1926. 213 p. illus. 8°. $3.25. **OLK (117)**

Amply illustrated discussion of simple and compound harmonic motion, plotting, machines, cycloids, artistic beauty, stereoscopic curves, analysis, and a large number of special curves. For the most part no mathematics beyond trigonometry are required. Author is a teacher in Creighton University.

Reviewed in *Popular astronomy,* Jan., 1927.

Smithells, Colin J. Tungsten, a treatise on its metallurgy, properties and applications. London: Chapman and Hall, Ltd., 1926. viii, 167 p. illus. 8°. 21s. **VIT (117)**

"It deals with the metallurgy and metallography of tungsten, both from the theoretical and the practical points of view, and if, in future editions, a section on the chemistry of tungsten were added, it would be a very complete and exhaustive treatise... A careful, accurate, and painstaking monograph on the metal. He has succeeded, too, in making it readable as well." — *Engineering, Nov. 19, 1926.*

* **Stoner,** Edmund C. Magnetism and atomic structure. London: Methuen and Company, Ltd., 1926. xiii, 371 p. diagrs. 8°. $5.00. **PGS (121)**

Advanced mathematical work describing the attempts to interpret magnetic phenomena in terms of the quantum theory, which has been so successfully applied to the general problem of atomic structure. Contains a history of magnetism and numerous references to original sources. Author is Lecturer in Physics at the University of Leeds.

* **Suevern,** K. Die künstliche Seide, ihre Herstellung und Verwendung, mit besonderer Berücksichtigung der Patent-Literatur bearbeitet, mit Arbeit von H. Frederking. Berlin: Julius Springer, 1926. xix, 1108 p. illus. 5. enl. ed. 8°. **VLNE (121)**

Exceeds the 4th edition (1921) by 417 pages. A thorough abstract of the patent literature from the time of de Chardonnet down to 1925, but now omitting references concerning properties, investigation, and dyeing.

Voorhees, Edward B. Fertilizers. The source, character and composition of fertilizer materials and suggestions as to their use. 2. rev. ed. by Sidney B. Haskell. New York: The Macmillan Company, 1926. xix, 310 p. illus. 12°. $2.50. **VPH (Stack)**

Standard work, first published in 1898, now thoroughly revised by the Director of the Massachusetts Agricultural Experiment Station. Shows the economy and dangers in the use of the newer plant food materials developed through the resources of chemical engineering; suggests recently approved fertilizing systems for the different types of farming and special crops; and contains new information on the fertilizing of lawns and golf courses, trees, fruits, and berries.

* **Waeser,** Bruno. The atmospheric industry, with special consideration of the production of ammonia and nitric acid, translated by Ernest Fyleman, with a foreword by J. F. Crowley. London: J. and A. Churchill, 1926. 2 v. 8°. 42s. **VOF (119)**

The introduction outlines developments prior to the advent of direct fixation and gives some account of the Chilean nitrate industry. Part I deals with the history and economics of the industry in the various countries; and Part II has to do with the several commercial processes. Good bibliographies and lists of patents.

"It is essentially a compilation and is uncritical... With all its limitations, [it] is the only one which covers such a wide ground in such detail." — *Chemistry and industry, Oct. 29, 1926.*

Also reviewed in *Electrician,* Dec. 24, 1926.

* **Weiser,** Harry Boyer. The hydrous oxides. New York: McGraw-Hill Book Co., Inc., 1926. x, 452 p. diagrs. 8°. $5.00. **PND (119)**

A critical summary of the numerous scattered facts. The first chapter deals in a general way with the structure, preparation, and properties of gels. Separate chapters are then devoted to the typical oxides of iron, chromium and aluminium, after which the remaining oxides are taken up according to the position of the elements in the periodic table. Chapters on tanning, mordants, water purification, cement, and the soil. Author is Professor of Chemistry in Rice Institute.

Reviewed in *Engineer,* Jan. 28, 1927.

Wilkins, Harold T. Marvels of modern mechanics: the mastery of land, sea and air. London: T. Fisher Unwin, Ltd., 1926. 251 p. illus. 8°. 10s.6d. **V (121)**

Provides the layman with an up-to-date account of atoms, salvaging, the sun, seal hunting, radio, modern archæology, sea charting, operation of underground railroads, modern railway marvels, the gyroscope, cable-ships, aeronautics, scenic art, ocean transportation.

Industries and Industrial Arts, continued.

* **Wykes,** A. L. The working of viscose silk. Manchester: John Heywood, Ltd., 1926. 35 p. illus. 12°. 2s. **VLNE (121)**

Physical properties of rayon as determined from some 1500 measurements.

Art

The **Architectural Forum.** Seventy-two designs for fireproof homes, from a national competition among architects, draftsmen and architectural students, approved by the American Institute of Architects and conducted by the Architectural Forum. [Chicago:] The United States Gypsum Company, cop. 1925. 112 p. illus. 4°. **MRGK**

Ayres, Atlee B. Mexican architecture; domestic, civil & ecclesiastical; photographs & text by Atlee B. Ayres, four hundred and twenty-six illustrations. New York: W. Helburn, Inc., 1926. 5 p.l., 150 pl. on 75 l. ob. f°. **†† MQWN**

Bauch, Kurt. Jakob Adriaensz Backer; ein Rembrandtschüler aus Friesland... Berlin: G. Grote [1926]. 120 p. illus. sq. 4°. (Grote'sche Sammlung von Monographien zur Kunstgeschichte. Bd. 5.) **MCH (Backer)**

Bell, Edward. Prehellenic architecture in the Aegean. London: G. Bell and Sons, Ltd., 1926. xvi, 213 p. illus. 12°. (The origins of architecture.) **MQM**

Bottomley, Myrl E. The design of small properties; a book for the home-owner in city and country... New York: The Macmillan Company, 1926. xiv p., 1 l., 233 p. illus. 8°. (The rural science series.) **MSF**

Bragdon, Claude Fayette. Architecture and democracy. New York: A. A. Knopf, 1926. xi p., 1 l., 183 p., 1 l. illus. 2. ed. 8°. **MQE**

Calder, Alexander. Animal sketching. Pelham, N. Y.: Bridgman Publishers [cop. 1926]. 3 p.l., 9–62 p. 8°. **MBB**

Codrington, K. de B. Ancient India, from the earliest times to the Guptas, with notes on the architecture and sculpture of the mediæval period, with a prefatory essay on Indian sculpture, by William Rothenstein. London: E. Benn, Ltd., 1926. xv, 65 p., 76 pl. illus. f°. **†† MAF**

Curzon (1st marquis), George Nathaniel Curzon. Bodiam Castle, Sussex; a historical & descriptive survey by the Marquis of Curzon of Kedleston... London: J. Cape, 1926. xvi, 164 p. illus. 4°. **† MQWK**

Dvořák, Max. Pierre Bruegel, l'ancien; trente-sept chromophototypographies d'après ses principales œuvres à Vienne, avec une introduction dans son art. Vienne: Éditeur Imprimerie de l'état autrichien [1926]. 32 p. illus. f°. **††† MCH**

Estrade, C. Broderies hindoues. [Par C. Estrade.] Paris: E. Henri [1926]. 3 l., 38 pl. f°. **† MOT**

Fielding, Mantle. Dictionary of American painters, sculptors, and engravers... Philadelphia: [Lancaster Press, Inc., 1926]. vii, 433 p. illus. 4°. *** R – Room 313**

One of 700 copies printed.

Guérinet, Armand, editor. Décorations japonaises & chinoises. [Série 3.] Paris: A. Guérinet [1926?]. illus. f°. (Matériaux & documents d'art décoratif.) **††† MLF**

Guillaume, Paul, and Thomas Munro. Primitive negro sculpture; with illustrations from the collection of the Barnes Foundation at Merion, Pennsylvania. New York: Harcourt, Brace & Company [cop. 1926]. 4 p.l., 134 p. illus. 4°. **MADF**

Habsburg-Lothringen Familien-Fideikommiss-Bibliothek, Vienna. Chinesische Miniaturen. Erste Folge: Aus dem Leben einer chinesischen Dame, hrsg. von Dr. Rudolf Payer-Thurn. Leipzig: Thyros-Verlag, 1924. 2 l., 12 col'd mounted pl. f°. **†† MAG**

No more published.

Hambidge, Jay. The elements of dynamic symmetry. New York: Brentano's [cop. 1926]. 3 p.l., v–xx p., 1 l., 140 p. illus. 8°. *** R – Room 313**

Hyam, Edward E. The early period of Derby porcelain (1750–1770). London: Hyam & Co., 1926. 29 p. illus. 12°. **MPGO**

Irwin, Frederick T. The story of Sandwich glass and glass workers. [Manchester, N. H.: Granite State Press, cop. 1926.] 99 p. illus. 8°. **MPW**

Jacobs, Michel. The art of composition; a simple application of dynamic symmetry. Garden City, N. Y.: Doubleday, Page & Company, 1926. xviii p., 1 l., 141 p. illus. 4°. *** R – Room 313**

Kleinschmidt, Beda. Die Basilika San Francesco in Assisi. Berlin: Verlag für Kunstwissenschaft, 1915–26. 2 v. illus. f°. **† MRBD**

Koch, Alexander. 1000 Ideen zur künstlerischen Ausgestaltung der Wohnung; hrsg. von Alexander Koch. Darmstadt: A. Koch, G.m.b.H. [cop. 1926.] 3 l., 205 p. illus. f°. **† MLO**

Koester, August. Die griechischen Terrakotten. Berlin: H. Schoetz & Co., G.m.b.H., 1926. 97 p. illus. 1. ed. 8°. **MGH**

Lockwood, Luke Vincent. Colonial furniture in America. 3d ed. Supplementary chapters and one hundred and thirty-six plates of new subjects have been added to this edition, which now includes over a thousand illustrations of representative pieces. New York: C. Scribner's Sons, 1926. 2 v. illus. f°. **† MOF**

Art, continued.

McColvin, Lionel Roy. Euterpe; or, The future of art. London: K. Paul, Trench, Trubner & Co., Ltd. [1926.] 75 p. 16°. (To-day and to-morrow.) **MA**

Major, Howard. The domestic architecture of the early American republic, the Greek revival, with a frontispiece in colour and 256 illustrations. Philadelphia & London: J. B. Lippincott Company, 1926. xxi(i) p., 1 l., 95(1), 236 p., 1 l. illus. 4°. **MQWO**

Marillier, Henry Currie. "Christie's," 1766 to 1925. London: Constable & Co., Ltd., 1926. xii, 311 p. illus. 4°. **MAZ**

Millenet, Louis Élie. Enamelling on metal; a practical manual on enamelling and painting on enamel as applied particularly to gold and silver ware and art metal work, translated from the French by H. de Koningh... London: C. Lockwood and Son, 1926. xiv, 112 p., 5 pl. 12°. **MNV**

Modern French decorative art; a collection of examples of modern French decoration, with an introduction by Léon Deshairs ... London: The Architectural Press [1926]. xi, 188 p. illus. f°. **† MLO**

Preface signed: H. de C. Hastings.
"The plates were selected from the hundreds of illustrations which appear regularly in the magazine Art et décoration." — *Introduction.*

Myers, Louis Guerineau. Some notes on American pewterers. Garden City, N. Y.: Printed for L. G. Myers by Country Life Press, 1926. xiii p., 1 l., 96 p. illus. 4°. **MNP**

Nordiska Museet, Stockholm. Swedish textiles; edited by Emelie von Walterstorff ... [Stockholm, 1925.] 89 p. illus. 4°. **† MON**

Northend, Mary Harrod. Historic doorways of old Salem, illustrated from photographs by the author. Boston and New York: Houghton Mifflin Company, 1926. xv, 96 p. illus. 8°. **MRR**

Park, Bertram, and Yvonne Gregory. Living sculpture; a record of expression in the human figure, with an historical and descriptive introduction by G. Montague Ellwood. London: B. T. Batsford, Ltd. [1926.] 32 p., 56 pl. 4°. **† MBG**

Peirce, Hayford, and Royall Tyler. Byzantine art. London: E. Benn, Ltd., 1926. 56 p., 50 pl. 8°. (Kai Khosru monographs on Eastern art.) **MAK**

Perleberg, Hans Carl, compiler. Idées pratiques; cent quinze motifs décoratifs... arrangés et publiés par H. C. Perleberg. Paris [192–?]. 32 mounted col'd pl. f°. **††† MLD**

Rutter, Frank Vane Phipson. Evolution in modern art; a study of modern painting, 1870–1925. London: G. G. Harrap & Co., Ltd. [1926.] 166 p., 35 pl. 8°. **MAL**

Salwey, Jasper Philip. Sketching in lead pencil for architects and others. New York: C. Scribner's Sons, 1926. 174 p. illus. 8°. **MBB**

Schmitz, Hermann. The encyclopaedia of furniture; an outline history of furniture design in Egypt, Assyria, Persia, Greece, Rome, Italy, France, the Netherlands, Germany, England, Scandinavia, Spain, Russia, and in the Near and Far East up to the middle of the nineteenth century...compiled by authorities in various countries under the general direction of Dr. Hermann Schmitz...and with an introduction by H. P. Shapland. [London:] E. Benn, Ltd. [1926.] xx, 63, 320 p. illus. f°. **† MOF**

Séguy, E. A. Bouquets et frondaisons; 60 motifs en couleur. Paris: C. Massin & Cie [1926?]. 20 col'd pl. f°. **†† MLD**

Sirén, Osvald. The imperial palace of Peking; two hundred and seventy-four plates in collotype after photographs by the author, twelve architectural drawings and two maps, with a short historical account. Part 1. Paris: G. Van Oest, 1926. illus. f°. **† MQWS**

Solomon, W. E. Gladstone. The charm of Indian art. London: T. F. Unwin, Ltd. [1926.] 142 p. illus. 8°. **MAF**

Spargo, John. The potters and potteries of Bennington. Boston: Houghton Mifflin Company and Antiques Incorporated, 1926. xv, 270 p., 1 l. illus. 4°. **MPH**

Sugden, Alan Victor, and J. L. Edmondson. A history of English wallpaper, 1509–1914; with 70 plates in colour and 190 illustrations in half-tone. London: B. T. Batsford, Ltd. [1926.] xiii, 281 p. illus. f°. **† MLP**

Tokiwa, Daijo, and Tadashi Sekino. Buddhist monuments in China. v. 1–4 and v. 1A–2A. Tokyo: Society for the Study of Buddhist Monuments, 1925–26. illus. f°, 4°, 8°. **MAG** and **†† MAG**

Title from inserted leaflet.
Japanese text.
v. 1–4, plates; 1A–2A, text and notes.

Turner, Herbert. Artistic leather craft. London: Sir I. Pitman & Sons, Ltd., 1926. vii, 108 p. illus. 8°. **MOM**

Van Pelt, Garrett. Old architecture of southern Mexico. Cleveland: J. H. Jansen, 1926. 124 p., 1 l. illus. f°. **† MQWN**

Varnum, William Harrison. Pewter design and construction. Milwaukee, Wis.: The Bruce Publishing Company [cop. 1926]. 148 p. illus. 4°. **MNK**

Wagner, Charles L. H. Wagner's blue print text book of sign and show card lettering. Boston, Mass.: Wagner School of Sign Arts [cop. 1926]. 124 p., 71 pl. on 46 l. f°. **† MLW**

CIRCULATION STATISTICS FOR THE MONTH OF JANUARY, 1927

BRANCHES	CIRCULATION		NEW REGISTRATIONS	VOLUMES ACCESSIONED
	HOME USE (VOLUMES)	READERS OF REFERENCE BOOKS		
MANHATTAN				
Central Building:				
Central Circulation	55,475	—	824	1,030
Children's Room	3,168	3,560	51	119
Extension Division*	51,438	—	707	1,351
Library for the Blind	3,298	—	15	162
East Broadway, 33	14,002	2,029	235	297
East Broadway, 192	30,921	5,820	438	605
Rivington street, 61	23,041	3,000	341	523
East Houston street, 388	26,143	3,811	405	336
Leroy street, 66	15,622	831	190	328
8th street, 135 Second avenue	15,385	759	203	163
10th street, 331 East	26,451	2,438	371	419
13th street, 251 West	12,831	1,668	212	127
23rd street, 228 East	12,362	1,497	155	150
23rd street, 209 West	10,311	1,392	241	204
36th street, 303 East	11,254	1,183	128	198
40th street, 457 West	13,450	637	188	308
50th street, 564 Lexington avenue	8,910	725	117	47
51st street, 742 Tenth avenue	16,746	532	246	228
58th Street, 121 East	13,585	2,200	318	298
58th " 121 " Music Library	2,558	1,781	—	108
67th street, 328 East	20,087	2,697	196	212
69th street, 190 Amsterdam avenue	16,938	1,745	256	182
77th street, 1465 Avenue A	24,482	1,242	207	292
79th street, 222 East	20,691	1,156	253	184
81st street, 444 Amsterdam avenue	17,631	1,158	285	392
96th street, 112 East	34,871	3,709	278	2,293
100th street, 206 West	21,042	1,244	357	331
110th street, 174 East	29,059	3,623	473	470
115th street, 203 West	21,138	1,587	255	568
124th street, 9 West	13,133	1,260	185	251
125th street, 224 East	14,214	1,123	277	234
125th street, 518 West	21,896	1,373	317	439
135th street, 103 West	14,358	2,917	289	464
145th street, 503 West	25,619	1,180	359	485
St. Nicholas avenue, 1000	20,982	1,679	285	351
179th street, 535 West	27,198	2,089	388	512
THE BRONX				
140th street, 321 East	22,708	2,036	480	485
Morris avenue, 910	20,185	1,792	295	338
160th street, 761 East	37,310	3,211	404	271
168th street, 78 West	11,155	1,391	224	163
169th street, 610 East	34,442	2,503	631	814
176th street and Washington avenue	41,835	3,674	625	391
Bainbridge avenue, 2556	37,294	2,740	642	302
Kingsbridge avenue, 3041	6,196	634	110	62
RICHMOND				
St. George	9,541	2,630	120	189
Port Richmond	13,171	1,164	169	228
Stapleton	9,191	587	75	173
Tottenville	6,036	300	30	106
Totals	959,354	86,307	13,850	18,183

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* In addition 861 books were read at agencies of the Extension Division.

PRINCIPAL DONORS IN JANUARY, 1927

	VOLS.	PMS.
Abbott, William Pratt		1
Adam, Geheimrat, Dr.	2	
Adlerblum, Dr. Nima H.	1	
American Historical Society	4	
American-Irish Historical Society	1	
American Trade Publishing Company	1	
Amtorg Trading Corporation	1	
Asociacion de Automovilistas de Valparaíso	1	
Badanes, Mrs. H. (1 manuscript)		
Banning, Kendall (1 broadside)		
Belgische Boerenbond	17	4
Belgium. Ministère des Travaux Publics	18	
Ben-Allah	1	
Bilboa. Camara Oficial de Comercio, Industria y Navegación	4	
Blunt, Estate of Miss Georgiana	3	
Bodet, Jaime Torres	1	
Bolivia. Ministerio de Hacienda	4	1
Bremen, Stadtbibliothek	226	2
Cahan, Abraham	3	
Carriers Publishing Company	2	
Carruth, Arthur Jay		1
Chile-American Association	8	17
China. Commission on Extraterritoriality		3
Cirenaica, Governo della	2	
Coleman, Edward D.	17	
Curtis, Mrs. Eleanor		12
Davies & Co.	1	
Deguent, Major R.	1	1
Delavan, Dr. D. Bryson	1	
Delehanty, M. J. (2 charts)		
De Long, Dr. Irwin Hoch		1
Disney, W. Reed	2	
Durand, Mrs. Herbert	1	
Eagleton, Dr. Wells P.	1	
Godard, Geo. S. (1 medal)		
Goldschmidt, Prof. Dr. Ernst F.	2	
Goldsmith, Alfred F. (9 photographs, 1 lithograph, 27 programs)		
Grant, Robert	1	
Gregg Publishing Company	4	
Hersloff, Miss Harriet	13	
Hildebrand, Wm. A.		2
India. Jammu and Kashmir Government	1	
Industrial Press (156 periodicals)	16	2
Iridore School for Professional Candy Making	1	

	VOLS.	PMS.
Iselin, Columbus O'Donnell	3	
Janet, Charles	1	
Jewish Social Service Association	1	
Kane, Grenville		1
Kaufman, Grand Rabbi S.	1	
Kells, Dr. C. Edmund	1	
Kemp, Mrs. Etta (1 broadside)		
Keogh, Dr. Chester Henry	1	
Kussman, Leon	1	
Kuttner, Mrs. Ann G.	6	
Lago, James V.	20	
Levis, H. C. (2 prints)		
Liederman, Earle E.	1	
Little, James Macfarlane	1	
Loux, Du Bois H.	1	
McCaffery, Ellen		1
Martyn, Charles	3	2
Mexican Embassy to the United States	3	2
Miller, Rabbi Julian H.		1
Mowry, Duane (17 manuscript letters)		
National Shorthand Reporters Association (1169 periodicals)	1167	1334
Neifeld, M. R.		1
New Journal		1
Nicoll, DeLancey (1 chart)		
Orange, Samuel P.	1	
Oregon Pioneer Association (1 broadside)		4
Payson & Clarke, Ltd.		1
Phifer, Robert Smith		9
Preussische Staatsbibliothek		1
Robinson, Sara Featherstone (1 print)		1
Saunders, Joseph B.	1	
Schickel, Miss E. (363 photographs)		
Sholem Aleichem Foundation	1	
Smith, Howard B.	1	
Stewart, Miss Jeanie	24	
Stokes, I. N. Phelps	1	
Sun, The	225	
Sutphen, Rev. Van Tassel	1	
Taylor, Captain Drew Kirksey		1
Thalmann, Max		2
Volkert, Hans (23 prints)		2
Weldin, J. R. Company	1	
Wiethan, Mrs. M. J. (10 periodicals)	79	8
Willy, John		1

PUBLICATIONS OF THE NEW YORK PUBLIC LIBRARY

(Now in Print)

HISTORY AND GUIDES

	PRICE
History of The New York Public Library, by H. M. Lydenberg. 1923	$2.00
Handbook of The New York Public Library	.25
Facts for the Public	.05
Central Building Guide	.05
Questions About Your Library (General Information about the Library)	Free
For Sightseers. Central Building	Free

PERIODICALS

Annual Report of The New York Public Library. (A limited number are given free upon request.)

Bulletin of The New York Public Library. Published monthly. Chiefly devoted to the Reference Department. Bibliography, news of the Library, reprints of manuscripts, descriptions of new accessions. $1.00 a year; current single numbers for 10 cents. Back numbers at advanced rates.

Branch Library Book News. A selected list of new additions to the Circulation Department, with other lists and articles. Published monthly, except in July and August. For sale at the Branches and at the Inquiry Desk. 2 cents a copy; 25 cents a year, postpaid.

New Technical Books. A selected list of books on industrial arts and engineering, recently added to the Library. Published quarterly. 25 cents a year, postpaid.

Municipal Reference Library Notes. Published weekly except during July and August, for circulation among the officials and employees of the City of New York. Price: $2.00 a year; 5 cents a copy. Apply at Room 512, Municipal Building.

LIST OF BOOKS IN THE LIBRARY RELATING TO VARIOUS TOPICS, TEXTS PRINTED FROM MANUSCRIPTS OWNED BY THE LIBRARY, ETC.

REFERENCE DEPARTMENT

	PRICE
Almanacs, A list of New York, 1694–1850. 1921	1.00
American Interoceanic Canals. A list of references. 1916	.30
American-Romani Vocabulary, by Albert Thomas Sinclair. 1915	.05
Armenia and the Armenians. A list of references. 1919	.30
Article of Faith, An, by Hiller C. Wellman. 1919	.05
Assyria and Babylonia. A list of references. 1918	.45
Astor Library, Catalogue of the. 8 volumes. Sewed. Per volume	5.00
Automobile Tires. A list of references. 1923	.10
Avery Collection, Handbook of. 1901. 84 p.	.50
Avery Collection, Handbook of — Supplement: Additions of Prints, 1901–1920. 1921	.15
Avesta and Romani, by Albert Thomas Sinclair. 1916	.05
Beadle Collection of Dime Novels. 1922	.50
Beaumarchais, Editions of, in New York City. 1925	.15
Berlin and the Prussian Court in 1798. From a ms. journal of Thomas Boylston Adams. 1916	.15
Billings, Dr. John Shaw, Memorial Meeting in honor of the late. 1913	.10
British Genealogy and Local History, List of works relating to. 1910	1.15

	PRICE
City Planning and Allied Topics, Select list of works relating to. 1913	.15
Color Photography. 1924	.75
Columbus. Letter of Columbus on the discovery of America. Facsimile of the pictorial edition, with a new and literal translation, and a complete reprint of the four oldest Latin editions. 1892. Cloth	.50
Commencement Addresses by Stephen H. Olin and Carl B. Roden. 1924	.10
The Compensations, by Asa Don Dickinson. 1922	.05
Cruise of the U. S. Brig *Argus* in 1813. Journal of Surgeon James Inderwick. 1917	.10
Dehydrated Foods. A list. 1917	.05
Does New York Know New York? Its Library, for Instance, by Edward J. O'Brien. 1919	Free
Druids and Druidism. A list of references. 1920	.05
Early American Poetry, 1610 to 1820. A list of works. 1917	.20
Echo-Device in Literature. By Elbridge Colby. 1920	.25
Egypt, Ancient. Sources of Information. 1925	2.75
Emmet Collection of Mss., Prints, etc., Catalogue of. Sheets. 1900	5.00
Eno Collection of New York City Views. 1925	.75
Flatboating on the Yellowstone, 1877. By Fred G. Bond. 1925	.25
Folk Music of the Western Hemisphere. 1925	.50
Geology, Mineralogy and Palæontology of New Jersey, List of works on. 1916	.15
Gypsies in Carniola and Carinthia, by Albert Thomas Sinclair. 1917	.05
Gypsies of Monastir, by Rev. Lewis Bond. 1917	.05
Henry George and the Single Tax. 1926	.50
Heritage of the Modern Printer, by Margaret B. Stillwell. 1916	.05
Historical Printing Club, Publications of the. (List and prices furnished upon application.)	

	PRICE
Historical Prints and Early Views of American Cities. Catalogue of Exhibition. 1917	.05
Holcroft, Thomas, A Bibliography of. By Elbridge Colby. 1922	.60
Holt, John — Printer and Postmaster. 1920	.10
Hudson, Henry, The Hudson River, Robert Fulton and Steam Navigation, List of prints, books, manuscripts, etc., relating to. 1909	.30
Inks, Chemistry and Manufacture of. 1926	.75
Inventory of the Rensselaerswyck Manuscripts. 1924	.25
Irvingiana, The Seligman Collection of. 1926	.25
Isle de Bourbon (Réunion) Documents, 1701–1710. Printed from the original manuscript in the Library. 1909	.20
Japanese-American Relations. A list of works. 1921	.40
The Jewish Division in the Reference Department. 1926	Free
Jewish Life in Oriental Countries. A list of books and manuscripts exhibited. 1927	.10
Journalism. A bibliography. 1924	2.00
Joys of Librarianship, by Arthur E. Bostwick. 1918	.05
Kennan Collection. By Abraham Yarmolinsky. 1921	.10
Latin-American Periodicals Current in the Reference Department. 1920	.05
Letters of American Clergymen, 1711 to 1860. 1917	.05
Letters of American Physicians and Surgeons. 1919	.05
The Librarian Himself, by H. L. Koopman. 1916	.05
Librarian as a Unifier, by Andrew Keogh. 1915	.05
Library Tonic, by George Parker Winship. 1917	.05
The Lost Librarian, by Miss G. M. Walton. 1925	.10
Lycanthropy. A list of works. 1920	.05
Macpherson's Ossian and the Ossianic Controversy. A contribution towards a bibliography. 1926	.25
The Manuscript Division, by Victor Hugo Paltsits. 1915	.15

	PRICE
Mountaineering. Selected list. 1916	.05
Music Publishers in New York City before 1850. A directory. 1917	.10
Nationalization of Coal Mines. 1920	.10
Naval Architecture and Shipbuilding. A list of references. 1919	.20
The New York Public Library and the Business Man. 1923	Free
The New York Tercentenary. An exhibition of the history of New Netherland, 1524–1674. 1926	.30
Newspapers and Official Gazettes, Checklist of. 1915	1.85
Numismatics. List of works. 1914	.65
Old Prints in the Prints Division. 1918	.05
Orlando Gibbons Tercentenary, by Jeffrey Mark. 1926	.15
Oxy-Acetylene Welding. List. 1914	.15
Pageants in Great Britain and the United States. A list of references 1916	.15
Paintings, Catalogue of, in the picture galleries of the Library. 1927	.10
Persia, List of works relating to. 1915	.50
The Photostat in Reference Work. 1925	.15
The Pitcairn Bible. 1924	.15
Prints and their Production: Supplement. 1917	.05
Provençal Literature & Language. 1925	3.00
Robinson Locke Dramatic Collection. 1925	.10
Romani and Dard, by George F. Black. 1916	.05
Russian, other Slavonic and Baltic Periodicals, A list of. 1916	.15
Schoolroom Decoration. A list of references. 1917	.05
Scotland. A list of works. 1916	3.00
Selenium. A list of references, 1817–1925. 1927	.65
Shakespeareana, Catalogue of Exhibition of, compiled by Henrietta C. Bartlett. 1916	1.00
The Soul of the Library, by J. I. Wyer. 1923	.05
Spalding Baseball Collection. 1922	.20
Stauffer Print Collection, by Charles Allen Munn. 1916	.05
Storage Batteries. A list of references, 1900–1915. 1915	.15
Submarines. A list of references. 1918	.35
Superstructures, by W. N. C. Carlton. 1918	.05
Tilden, S. J. Letters and Literary Memorials, edited by John Bigelow. 2 v. 1908	6.00
Tilden, S. J. Writings and Speeches, edited by John Bigelow. 2 v. 1885	6.00
Timothy Dexter and His "Pickle for the Knowing Ones." 1922	.15
To Nebraska in '57. A Diary of Erastus F. Beadle. 1923	2.00
Torpedoes. A list of references. 1917	.30
The Walt Whitman Exhibition. By Emory Holloway. 1925	Free
War Memorials. A list. 1919	.05
War Taxation, 1914–1917. A list of references. 1917	.05
Washington Eulogies. A checklist. 1916	.25
Washington's Note Book. Selections from a newly discovered manuscript, edited by Victor Hugo Paltsits. 1920	.05
What Did Macaulay Say About America? Text of four letters to Henry S. Randall. 1925	.40
What's the Matter with the Public Library? By E. L. Pearson. 1922	Free
Why They Came to the Library. 1920	Free
Winthrop, Theodore, Bibliographical notes on, by Elbridge Colby. 1917	.05
Winthrop Books, Plates of the, by Elbridge Colby. 1918	.05

MUNICIPAL REFERENCE LIBRARY

Publications to be obtained at the Municipal Reference Library, Room 512, Municipal Building.

	PRICE
Guide Posts on the Road to Health; A list of books	.10
Teaching Citizenship via the Movies. A survey of civic motion pictures	.10
Visualizing Citizenship	.15
What to Read on New York City Government. A list of references	.05

CIRCULATION DEPARTMENT

Publications to be obtained at any Branch Library, or from the Chief of the Circulation Department, 476 Fifth Avenue. Publications given free unless otherwise stated.

Branch Library Book News. *See* Periodicals.

LISTS OF BOOKS FOR ADULTS

Altman Collection

Books of Interest to Women Voters

Catalogue of Books for the Blind in Revised Braille. Grades One, Two and Three. November, 1921; Supplements, December, 1922, January, 1925

Catalogue of Books for the Blind in Revised Braille. Grade One-and-a-Half. November, 1921; Supplement, October, 1924; May, 1925

Catalogue of Books for the Blind in the Moon type. November, 1921; Supplements, December, 1922, October, 1924.

Catalogue of Music Scores in the Braille Type. July, 1922; Supplement, October, 1926.

Christmas Exhibit

Current Periodicals and Newspapers on File at the Branches

Fairy Tales for Grown-up Readers

List of Piano Music

Military Training

"The New York of the Novelists"

Old-Fashioned Novels

Plays of Thirteen Countries

Poetry of the Supernatural

Polish Book List

Romans à Clef; A List of Novels with Characters based on Real Persons

Sailor's Yarns. 2 cents

Stories of Romance and Imagination

Stories of the Sea. 5 cents.

Supplement to the Catalogue of Music for the Blind. Music Scores in the American Braille and New York Point Types

Wanderers and Vagabonds

LISTS FOR CHILDREN

Favorite Stories of the Library Reading Clubs

Journeys to Foreign Lands

LISTS FOR ADULTS AND CHILDREN

New York City and the Development of Trade

Sea and Shore

The Shakespearian Festival

BOARD OF TRUSTEES

W. Vincent Astor
George F. Baker, Jr.
Samuel Greenbaum
Edward S. Harkness
Patrick Cardinal Hayes
Arthur Curtiss James
Grenville Kane
Lewis Cass Ledyard
John G. Milburn
J. Pierpont Morgan
Morgan J. O'Brien
William Barclay Parsons
Frank L. Polk
Elihu Root
Edward W. Sheldon
I. N. Phelps Stokes
Henry Walters
Payne Whitney
Bronson Winthrop

James J. Walker, Mayor of the City of New York, *ex officio*
Charles W. Berry, Comptroller of the City of New York, *ex officio*
Joseph V. McKee, President of the Board of Aldermen, *ex officio*

OFFICERS

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First Vice-President, Elihu Root.
Second Vice-President, ———
Secretary, Frank L. Polk.
Treasurer, Edward W. Sheldon, 45 Wall Street.
Assistant Treasurer, United States Trust Company, 45 Wall Street.
Director, Edwin H. Anderson, 476 Fifth Avenue.

Chief Reference Librarian, H. M. Lydenberg, 476 Fifth Avenue.
Chief of the Circulation Department, Franklin F. Hopper, 476 Fifth Avenue.
Editor, Edmund Pearson, 476 Fifth Avenue.

BUILDINGS AND BRANCHES

Central Building, 476 Fifth Avenue, contains general administrative offices of the whole system, all Divisions of the Reference Department, and the Central Circulation Branch, Central Children's Room, Library for the Blind, and the Extension Division.

Municipal Reference Branch, Room 512, Municipal Building. (Free for reference.)

CIRCULATION BRANCHES

MANHATTAN

33 East Broadway. (Chatham Square.)
192 East Broadway. (Seward Park.)
61 Rivington Street.
388 E. Houston St. (Hamilton Fish Park.)
66 Leroy Street. (Hudson Park.)
135 Second Avenue. Near Eighth Street. (Ottendorfer.)
331 East 10th Street. (Tompkins Square.)
251 West 13th Street. (Jackson Square.)
228 East 23rd Street. (Epiphany.)
209 West 23rd Street. (Muhlenberg.)
303 East 36th Street. (St. Gabriel's Park.)
457 West 40th Street.
564 Lexington Avenue. (Cathedral.)
742 Tenth Avenue. Near 51st Street. (Columbus.)
121 East 58th Street.
328 East 67th Street.
190 Amsterdam Avenue. Near 69th Street. (Riverside.)
1465 Avenue A. Near 78th St. (Webster.)
222 East 79th Street. (Yorkville.)
444 Amsterdam Avenue. Near 81st Street. (St. Agnes.)
112 East 96th Street.
206 West 100th Street. (Bloomingdale.)
174 East 110th Street. (Aguilar.)
203 West 115th Street.
116th Street and Amsterdam Avenue. Room 108a, Columbia University Library (Columbia Sub-branch.)
9 West 124th Street. (Harlem Library.)
224 East 125th Street.
518 West 125th Street. (George Bruce.)
103 West 135th Street.
503 West 145th Street. (Hamilton Grange.)
1000 St. Nicholas Avenue. Cor. 160th Street. (Washington Heights.)
535 West 179th Street. (Fort Washington.)
178 Sherman Ave. (Inwood Sub-branch.)

THE BRONX

321 East 140th Street. (Mott Haven.)
761 East 160th Street. (Woodstock.)
910 Morris Avenue. Corner 162nd Street. (Melrose.)
78 West 168th Street. (High Bridge.)
610 East 169th Street. (Morrisania.)
1866 Washington Avenue. Cor. 176th Street. (Tremont.)
80 West 181st Street. (University Heights Sub-branch.)
1741 Wallace Ave. (Van Nest Sub-branch.)
2556 Bainbridge Avenue. (Fordham.)
3041 Kingsbridge Avenue. Near 230th Street. (Kingsbridge.)
3917 White Plains Road. Near 223rd Street. (Williamsbridge Sub-branch.)
325 City Island Avenue. (City Island Sub-branch.)

RICHMOND

5 Central Avenue, Staten Island. (St. George.)
75 Bennett Street. (Port Richmond.)
85 State Street. (West New Brighton Sub-branch.)
132 Canal Street. (Stapleton.)
7430 Amboy Road. (Tottenville.)
56 Gifford's Lane. (Great Kills Sub-branch.)
180 Rose Avenue. (New Dorp Sub-branch.)